AMERICAN
DYESTUFF REPORTER
DEVOTED TO THE INTERESTS OF TEXTILE CHEMISTRY
BLEACHING • DYEING • FINISHING • PRINTING

VOLUME XX | OCTOBER 26, 1931 | NUMBER 21

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AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Published by Howes Publishing Company, 440 Fourth Avenue, New York

Devoted to the practical application of dyestuffs in all industries; especially to textile chemistry—the science and practice of scouring, bleaching, dyeing and finishing.

VOLUME XX | OCTOBER 26, 1931 | NUMBER 21

Developments in the Manufacture of Soap Products

By A. J. HALL, B.Sc., F.I.C., F.T.I.

The use of soap over many centuries can be accounted for by the fact that during this period no other substance has been discovered having quite the same useful detergent properties, and even today it cannot be said that a complete explanation of the detergent power of a soap has been formulated. But whilst a soap may be produced which is entirely satisfactory when used for household and hygienic purposes, it is in the application of such products to textile requirements that its shortcomings become noticeable. So that recent improvements in the manufacture of soap and similar substances can almost be traced to demands made by those responsible for the treatment of textiles.

AN ESSENTIAL fact is that in the wet processing of all kinds of textile materials soap is no longer used merely as a detergent. It is used to facilitate the penetration of the material by aqueous liquors such as are used in scouring and dyeing, it is used for dispersing dyestuff particles such that they can the more readily penetrate textile fibers, and it is also further used for improving the handle of woven and knitted goods. While it may be said that soap is very largely used as a detergent for wool and real silk (in scouring and degumming processes) it is true that for cotton and rayons soap is used less as a detergent than as an assistant for various dyeing and finishing purposes.

It seems reasonable to assume from recent progress in research on soap products that the old type of soap will shortly be largely displaced.

It will be remembered that the old type of soap consists merely of the sodium, potassium, or other salt of a fatty acid and is formed thus:

$$\underset{\text{Fatty acid}}{R.COOH} + NaOH = \underset{\substack{\text{Soap}\\(\text{Sodium Salt})}}{RCOO\,Na} + H_2O$$

Oleic, stearic, and palmitic acids have in the past been found to be the most convenient fatty acids for use in soap manufacture, and the potassium and sodium salts the most useful.

The calcium and magnesium salts of these fatty acids are insoluble in water and thus it happens that when a soap (the sodium or potassium salt) is used in hard water there is immediately formed an objectionable scum of the insoluble calcium and magnesium soaps since hardness of water is generally due to the presence of these metals. Thus in finishing or dyeing textile materials with soap liquors prepared with hard water there is always the danger of forming spots of the insoluble soaps on the material or of accumulating these insoluble soaps within the fibers sufficient to give them a harsh handle. The textile industry has therefore long asked for a soap which will not scum with hard water.

This demand was partially met several years ago by the production of *sulphonated* fatty acids, it being found that these did not readily form insoluble calcium and magnesium salts. Turkey red oil is an example of these products, it being formed by sulphonation with concentrated sulphuric acid of castor oil and has the general formula shown below:

$$\underset{\substack{\text{Fatty acid}\\(\text{castor oil type})}}{R(OH)COOH} + H_2SO_4 = \underset{\substack{\text{Sulphonated}\\\text{fatty acid}}}{R(O.SO_3H)COOH} + H_2O$$

As a matter of fact, the method of sulphonation then used did not allow the introduction of a large proportion of the sulphonic acid group (SO_3H) so that in very hard water formation of a scum occurred. However, by means of improved method of sulphonation in which use is made of the anhydrides of various organic acids it has been found possible to introduce into the fatty acid molecule

quite a large proportion of sulphonic acid groups, and the resulting products have much greater utility since they precipitate less readly when used in hard water. Monopole soap is a well known example of this type of highly sulphonated fatty acid.

With the appearance of the highly sulphonated Monopole soap further uses for such products were opened up. Firstly, Monopole soap was found to have excellent softening properties. Then it proved to have a stabilizing influence (it prevented crystallization) in fillings or weighting mixtures containing mineral salts such as magnesium sulphate and Glauber's salts. Further, Monopole soap was found to be a useful addition to dye liquors. But in all these applications Monopole soap, and the other similar highly sulphonated fats which afterwards appeared, suffered from the disadvantage that it was not *completely* immune from the formation of insoluble soaps. Hence the need for further research and improvement. This has now resulted in the production of soaps in which the most important group is not a carboxyl group or a sulphonic group but rather a hydroxyl group.

Aliphatic alcohols containing a comparatively large number of carbon atoms (for example, cetyl alcohol) are insoluble in water but can be rendered soluble by sulphonation thus:

$$\underset{\text{Aliphatic alcohol}}{R.OH} + H_2SO_4 = \underset{\substack{\text{Sulphonated}\\ \text{Aliphatic alcohol.}}}{R'(SO_3H).OH} + H_2O$$

Such compounds are very stable and have the great advantage of not forming insoluble soaps with calcium, magnesium, or similar metal. Further, the presence of both sulphonic and hydroxyl groups give these compounds considerable wetting-out powers. It is believed that Gardinol and Igepon A are compounds of this type, and as users of these substances know they can be added to concentrated solutions of metallic salts without the slightest fear of precipitation.

It is to be noted that in these newer soap products no alkali metal is necessarily present. In the older type, R.COONa, it was considered that in aqueous solution hydrolyis occurred such that caustic soda was formed to a small extent thus:

$$RCOONa + H_2O = RCOOH + NaOH$$

Further, it was believed that the cleansing action of the soap was largely due to this caustic alkali. In fact, various researches have been concerned with the correlation of the degumming action on real silk of a soap solution and the alkali developed by its hydrolysis. This difference between the newer and old types of soap is reflected in the fact that the newer types have a detergent action under acidic conditions whereas the older soaps under such conditions have no detergent power at all.

It will be remembered that soaps are largely employed in the treatment of animal fibers such as wool and real silk. Such fibers are deleteriously affected by alkalis and thus the soaps used in their treatment are required to be as neutral as possible. At the same time a certain amount of alkali must be present since in the presence of an acid or acid-forming salt the soap is decomposed with liberation of a scum of the fatty acid. Now it is possible to treat wool and silk with the newer types of soap in the presence of acid; there is thus no danger of alkali-attack of the fiber and at the same time the soap is perfectly stable and exerts its detergent action.

The broad fact thus appears that by eliminating the carboxyl group (COOH) from its position of importance in a soap and making use of the hydroxyl group (OH) in its stead the value of soaps has been increased and their field of application enormously widened. Research along these lines has received much encouragement by the commercial success of the newer soap products already discovered and marketed, and it is therefore anticipated that it will be continued with equally satisfactory results.

Important Source of Cochineal

According to Consul Clifton R. Wharton, Las Palmas, cochineal is one of the principal secondary products exported from the Canary Islands. Production is greatest during the dry months of August to October, although exportation is carried on throughout the entire year. In 1930 there was exported from Las Palmas $297,451 worth of cochineal, the following statistics showing quantities and countries of destinations:

EXPORTATION OF COCHINEAL FROM LAS PALMAS 1930

Countries of Destination	Kilos
France	216,300
United States	30,730
Germany	27,700
England	24,400
Italy	2,300
Spain (Continental)	1,400
Moroccan Ports	1,200
Portugal	100
Total	304,130

Further detailed information with regard to the trade, as well as a list of the principal exporters, will be furnished to qualified American firms upon request to the Chemical Division, U. S. Dept. of Comm.

New Card

In a new card, "Shades Fast to Salt Water on Tops (Slubbing) Produced with Helindon Colors," given out by the General Dyestuff Corporation, a number of shades are shown on slubbing, produced with Helindon Colors.

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The Effect of Tension on the Dye Absorptive Properties of Regenerated Cellulose Rayon*

By **B. L. HATHORNE**
Tubize Chatillon Corporation

This paper deals with the effect of tension applied subsequent to rayon manufacturing operations. An examination of the machinery and processes involved leads one to the conclusion that tension is the most important variable. Included in this discussion are: Apparatus and materials used, dyeing procedure, absorption of Sky Blue F F, absorption of other dyestuffs, and concluding remarks.

THE published works of Sir William Bragg, G. L. Clark, Lilienfeldt and others have proven that the structure of rayon can be materially altered by varying spinning conditions.

The unpublished work of Henry Green of the Tubize Chatillon Corporation has, in my opinion, definitely proven that variations in tension during spinning affect the dye absorptive properties of regenerated cellulose rayon to a very pronounced degree.

This paper deals only with the effect of tension applied subsequent to rayon manufacturing operations.

The investigation described herein was undertaken to definitely establish the cause of the unevenly dyed fabrics obtained by some fabric manufacturers from commercially acceptable rayons. Even casual examination of the fabrics in question, consideration of the machinery on which said fabrics were processed, and a consideration of the possible variables entering into the situation, must lead one to the conclusion that tension is the most important variable, and that its effect must be far greater than the effect of the other variables involved.

The published works of A. J. Hall, B.Sc., F.I.C., F.T.I. (Journal of the Society of Dyers and Colorists, 1929, 45.98, Cellulose, Dec., 1930, 275-280, Textile Colorist, Aug., 1931, 520-523) state that tension applied during the dyeing operation has a retarding influence on the dye absorptive properties of regenerated cellulose rayon for many dyestuffs, but does not retard the absorption of certain other dyes.

As the practical experience of the writer did not check with the observations of Mr. Hall, but rather indicated that all dyestuffs were affected in the same manner, though to a variable extent, by the application of tension during the dyeing process, it was decided that a careful investigation should be made in order that the facts might be definitely determined.

Apparatus and Material Used

A special monel metal beaker and a series of monel metal weights were so designed that any desired tension from zero to the breaking point of rayon could be maintained throughout the entire dyeing process by the simple expedient of hanging said weights on small skeins of rayon, the skeins being entirely immersed in the dye liquor.

Samples of a well-known brand of viscose process rayon were carefully chosen from the center of several skeins in order that the rayon might be as uniform as possible. In each series of dyeings, all samples used were taken from the same skein.

A dye solution of uniform strength was used throughout the entire series of experiments as the practical experience of the writer has shown that, under normal dyeing conditions and in normal dyeing concentrations, dyestuff concentration has little if any effect on existing variations in the dye absorptive properties of regenerated cellulose rayon. We do not mean to say that the variable dye absorptive properties of certain rayons cannot be reduced by changing the dye concentration together with other variables. We merely state that, all other factors remaining unchanged, within normal dyeing limits dye concentration does not affect existing variations in the dye absorptive properties of regenerated cellulose rayon.

Dyeing Procedure

The procedure used in this investigation was simplicity itself:—

1. Weights ranging from zero to the dry breaking point of the rayon used, were attached to a series of small rayon skeins.
2. The skeins were subjected to the weights described in (1) for a predetermined time period—one-half hour in most instances.
3. The experiments were so timed that the dyeings were started immediately upon release of tension from the dry skeins.
4. Weights ranging from zero to the west breaking point of the rayon used were attached to a second series of skeins. The second series was not subjected to tension until the dye bath was prepared.

* Presented before the Dye Division of the American Chemical Society at the Buffalo Meeting.

5. The dye bath was prepared with the proper ingredients and at the proper temperature.
6. The skeins subjected to and released from tension in the dry state before dyeing, and the skeins attached to tension weights for use during dyeing were placed in the dye bath.
7. All dyeings were run for one-half hour, the temperature being held uniform, after which the skeins were washed and dried.

Absorption of Sky Blue FF

The dyestuff listed in the British Colour Index as No. 518, in Schultz & Julius as No. 424, and sold by various manufacturers under such names as Sky Blue 6B, Sky Blue 6BX, Sky Blue FF, etc., so widely known for its tendency to accentuate such dye absorption differences as may exist between skeins of regenerated cellulose rayon was used in the first group of experiments.

A group of skeins subjected to tension before dyeing, as described above, together with a group of skeins subjected to tension during dyeing, were immersed in a dye liquor containing three grams per litre of Sky Blue FF maintained at a uniform temperature of 70° F. The skeins were immersed in this liquor for a period of one-half hour after which they were removed extracted and dried.

The experiment was repeated at temperatures of 100° F., 130° F., 160° F., 190° F. and 212° F.

Observation of the dyed skeins disclosed that increased increments of tension applied during the dyeing operation caused decreased absorption of dyestuff.

The yarns subjected to tension before dyeing but released from tension before being entered into the dye bath, dyed uniformly in every instance.

The above experiment was repeated with the addition of ten grams of Glauber's Salt per liter of dye solution. The observations reported in the case of the samples dyed without salt apply also to the samples dyed in salt baths with this addition—the skeins dyed in salt baths absorbed a greater amount of dyestuff than those processed without salt.

In order to determine whether or not tension applied for a long period of time prior to the dyeing operation, but released before dyeing, affected the dye absorptive properties of rayon, weights ranging from zero to the dry breaking strength of the rayon treated were suspended from small rayon skeins for variable time intervals—the intervals ranging from one-half hour to twenty-four hours. In no case did the application of tension prior to the dyeing operation, said tension being released before the dyeing operation, affect the dyeing properties of the treated samples to the slightest degree.

Absorption of Dyestuffs Other Than Sky Blue FF

In order to determine the effect of tension on the dye absorptive properties of regenerated cellulose rayon for the bulk of substantive dyestuffs, representative samples of each group listed in the British Colour Index that have a direct affinity for regenerated cellulose rayon were chosen. The list includes sulphur, Indanthrene and Indigoid colors as well as representatives of all divisions of the so-called "Direct Cotton" type of dyestuffs.

As the Sky Blue experiments indicated that temperature and salt do not affect the *variation* in the dye absorptive properties of a group of skeins subjected to varying tensions during dyeing, but merely change the dyeing *rate* of all of the skeins and the total absorption (under the conditions of the experiment) of all skeins tested, it was decided that dyestuffs other than Sky Blue FF should be tested under uniform dyeing conditions. We arbitrarily chose the following conditions:—

Dye concentration ....three grams per liter
Salt .....none
Temperature .....130° F.
Time .....one-half hour

Each of the dyestuffs chosen was applied to a group of skeins held under tensions varying from zero to the wet breaking strength of the rayon treated and to a group of skeins subjected to varying degrees of tension (from zero to the dry bursting point) prior to the dyeing operation. In every instance a distinct gradation from dark to light, the lightest skein being that subjected to the highest tension during the dyeing—was observed in the case of the skeins subjected to tension during dyeing, while the skeins subjected to and relieved from varying degrees of tension prior to the dyeing operation were observed to be uniform in shade.

Below will be found a list of dyestuffs tested together with the numbers to which they have been assigned in the British Colour Index:—

Pontamine Red 8BL	278
Fast Yellow NN	814
Erika 2GN	126
Diaminogen B Ex	317
Diamine Red EC	419
Fastusol Violet B	319
Niagara Blue DB	552
Erie Green MT	593
Erie Brown 3GN	596
Direct Brown G	606
Erie Yellow F	620
Dianil Yellow 5G	606
Rhodamine S	743
Erythosine N Conc	772
Euchrysine	797
Primuline NAC	812
Katigen Blue G Ex	939
Katigen 3CR	957
Indanthrene Blue GCDA	1113
Indanthrene Brown RA	1151
Brill. Indigoid 4B	1184
Zambesi Black DA	
Solantine Black L	
Thianthrene Pink FB	

(Continued on page 704)

Census of Dyes

The census of dyes and of other synthetic organic chemicals for 1930 has just made its appearance.

An Experience in the Production of Process Water For Use in A Textile Plant

By **WALTER E. HADLEY**
Consulting Chemist, Maplewood, N. J.

In the present day when textile manufacturers are locating at points where the water supply is unsuitable, considerable preliminary treatment is necessary to make it adaptable for mill purposes. Herein is contained a discussion of the author's experience in one such case.

SEVERAL years ago, it was my good fortune to have the opportunity of acquiring considerable theoretical, as well as practical experience, in the examination, and treatment, of water supplies for textile plants. Prior to that time, my experience, in water work, was undoubtedly the same as that of many other chemists, who realizing, in a more or less vague way, that a good industrial water is not necessarily an absolutely natural product, do not concern themselves with this phase of the question so long as they are able to draw an unlimited supply of water, at any time, by simply opening a faucet or valve. Excepting, possibly, when rust appears at rare intervals, no thought is given to the character of the water, or to the source of supply, yet long before the water reaches the consumer, considerable thought and care has been given to its preparation, at least in regard to its sanitary qualities, although often no thought has been expended on its adaptability for commercial application.

Fortunate, indeed, is the plant located in an area with an abundant water supply, and "twice blessed" are those plants which in addition to having an ample supply, can also count on one which is naturally soft.

Even now, whenever I find myself back in the New England states, and consider the tremendous volume of water in such streams as the Merrimack River, as it flows through the textile centers of Manchester, Lowell and Lawrence, my respect increases for those pioneers whose vision caused them to choose such locations for their mills, of course, primarily for the water power, but, I also like to believe, for the quality of the process water, as well.

In contra-distinction, we see, in the present day, textile manufacturers locating at points where the water supply is inadequate, and the raw water of such poor quality as to need a drastic treatment to render it at all suitable for any type of textile work. And then, as an anti-climax, we find, at times, the control of the water supply turned over by managers, who know little in regard to this commodity, to men who know but little more than themselves, and nothing whatsoever as to the theory of the treatment which different types of waters require, and often times the men chosen for this work will not even carefully follow instructions.

Under the foregoing conditions, sooner or later, trouble is bound to occur, and it was due to such lack of judgment, which once upon a time, brought about conditions which give rise to the following experience.

In the case under consideration, the water, under normal conditions, was comparatively clear, though at times it was badly contaminated with silt, as well as organic matter accumulated from the farm land through which the stream passed ere it reached the factory. The water, in question, had a hardness of approximately seven grains per U. S. gallon, expressed as Calcium Carbonate ($CaCO_3$).

The purification of the raw water, to render it suitable for bleaching, dyeing and finishing, required the proper pre-treatment with alkali and Aluminum Sulphate, to induce the correct flocculation, after which the water was passed through sand filters. The filtered water was, thereafter, thoroughly softened by passage through Zeolite beds.

Measured in terms of the water consumption of many textile plants, the volume of filtered and softened water was not large, although the demands were close to one million gallons per day, of which approximately one-quarter to one-half the amount was softened.

At certain seasons of the year, the organic coloring matter in the water was quite pronounced, but a pre-treatment with alkali, followed by subsequent coagulation, at no time requiring over three grains Aluminum Sulphate, per gallon of water being treated, produced a clear, sparkling product, after filtration.

Due to the fact that the water production was under the control of a section, other than the chemical department, made it difficult for the latter department to constantly follow all operations in its preparation.

Troubles Develop in the Processing

For no apparent reason, trouble began to develop throughout the various processes, being first noticed, particularly, where soft water was being used. Here, insoluble soaps were being produced, and dyestuffs were being

precipitated upon the goods and although the complaints were not confined alone to the softened water, being also found in the goods processed with filtered water, the trouble was most pronounced in the former case. Each succeeding day found greater difficulty in obtaining the required quota of softened water, and each day saw an increasing number of complaints in the processing of the goods. The softening beds were designed to produce 120,000 gallons each between regenerations, but the volume kept diminishing until eventually they were absolutely inactive, and no softened water could be obtained.

At this stage of the proceedings, the chemist was called in and given full authority to investigate the cause of the difficulty. Two experts, from the company who had originally supplied the filters and softening beds, visited the plant, but a thorough examination, on their part, did not disclose the cause of the trouble, and although certain simple recommendations were made regarding minor parts of the system no suggestions were made, by them, which would tend to correct and eliminate the cause of the trouble. They did recommend a thorough regeneration, using extra strength brine, but when this treatment did not show any improvement, the opinion was expressed that the zeolite was completely worn out, and the only thing to do was to remove it from the beds, and throw it on the refuse heap. Of course, thereafter, it could be replaced with new zeolite which their company would be glad to furnish.

Owing to the large number of pounds of zeolite involved, and the comparatively high cost of replacement, this move did not appeal to me as being an economical procedure.

Other experts, when called in, stated that in all their experience, they had never seen beds which behaved in such a manner. They, also, were of the opinion that the beds were "dead," and that the entire lot of zeolite would have to be removed and replaced with new zeolite before soft water would again be available. In the meantime, softened water was not available, although periodic regenerating treatments were still being given.

Sooner or later, such a state of affairs was bound to reach a climax, and when this condition came to pass, things began to happen, and to happen rapidly. Those who had been in practical charge of the water production were definitely at a standstill, and even the supervisor did not know what should be the next move.

General Conference Held

A general meeting was called, to which everyone was bidden who it was considered might have even the remotest idea of what the trouble was all about, and a casual glance at those in attendance at the meeting would tend to indicate that already we were "Grasping at straws" in an effort to locate the trouble. Here were men being asked to offer advice regarding a highly technical problem, who had never even seen the inside of a plant devoted to the treatment of industrial water, and who did not even know that treatment of a water was necessary. The one man in attendance, who theoretically should know something about the problem, or at least be able to intelligently consider the question in its several phases, was the chemist. After those present had all been given the opportunity to express their opinions, the chemist was asked if he cared to make any suggestions. The chemist, by that time, beginning to wonder what the meeting was all about, informed the chairman that if, and when, it was decided definitely to throw the zeolite away, he would appreciate having the beds for a period of two days, during which time the chemical department would be glad to conduct some practical trials with the view of reclaiming the damaged zeolite.

The time came, we felt for a while perhaps all too quickly, when the suggestions of the others having failed, the chemist was at last given freedom to try whatever he might have in mind. In the meantime, the chemical department had given a great deal of thought to the work in hand, and had already formulated a plan of campaign which was immediately put into effect.

It had been known, for a long time, that the man in charge of the practical work of producing the water knew nothing, whatsoever, of the basic reasons for any of the required treatments and therefore could only rely upon the "Rule of thumb" for carrying out the work. The operator had, of course, been carefully instructed regarding the proper dosage, time required for coagulation, rate of flow, and various other essential requirements, in regard to the treating of the raw and filtered water, when the work was originally taken over by him. For a short time, with the water running normal in the stream, he had obtained passable results. As time went on, however, and the quality of the raw water changed, and at times it did change and change rapidly, he ceased to follow the implicit instructions given him, and began to experiment on his own account. He was aware, by this time, if the water showed an acid condition, the addition of caustic soda would render the water neutral or alkaline, and he likewise observed, conversely, if the water was too alkaline, the addition of aluminum sulphate in turn gave him a neutral or acid water, depending upon the amount added. What, therefore, he reasoned, could be more simple; if small amounts of alum and caustic were good for the raw water, then naturally, larger amounts would be better; so the water began to receive liberal helpings of these chemicals, so much so, in fact, that the chemist, inadvertently, one day, walked into the plant at a time when large pails full of these compounds were being strewn promiscously into the coagulation basin, where the proper treatment called for not more than three grains of alum per U. S. gallon, and this in a water which usually carried, naturally, its full quota of required alkalinity. Even with this lack of control, for a time, everything went along smoothly, as far as production of the required volume of water was concerned, but when it came to a consideration of the quality of the water being produced, that was unfortunately another thing.

(Continued on page 701)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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CALENDAR OF COMING EVENTS

Annual Meeting
December 4, 5—Boston.

* * *

Meeting of Northern New England Section, Nov. 7th.

* * *

October meeting of Piedmont Section has been postponed until early in November.

ANNUAL MEETING NEWS

New England Invites Association to Boston

Every member of the Northern New England Section of the American Association of Textile Chemists and Colorists is looking forward with the keenest of anticipation to greeting personally the many members of the other sections of the Association at the eleventh annual meeting which is to be held December 4 and 5, 1931.

The setting of these meetings at the Hotel Statler in historic Boston should appeal to everyone. There will be sightseeing trips in and around Boston, and to such points as Lexington, Concord, Wayside Inn, etc. You will find New England hospitality as warm and genuine as reputed.

A program of unusual interest and merit has been prepared for your edification. Here will be speakers who are experts in their chosen fields of endeavor. Here will be forums with ample time for the discussion and solution of practical problems. Here will be a real opportunity to find the answer to that difficulty which has been baffling you.

Meals will be informal affairs where ample opportunity will be found for those chats you have been looking forward to — chats with other men in your business, about common interests and common problems—chats with association officers—chats between laymen and scientist. There will be a banquet on Saturday night.

An exceedingly worthwhile time awaits you.

Pack your grip and come to Boston.

Henry D. Grimes,
Chairman.

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Proceedings of the American Association of Textile Chemists and Colorists

The Dyers and Cleaners Problems in Relation to the Dyer and Finisher*

By **PAUL C. TRIMBLE**

Managing Director, National Association Institute of Dyers and Cleaners

THE perpetual and perennial problem in which textile people, be they weavers, conveyors, finishers, weighters, dyers or textile chemists, come in contact with the dry-cleaning industry to the regret and expense of the latter, is of course, the matter of silk weighting. You know all the background of this problem, how originally it was considered and still is considered legitimate to replace the twenty-five per cent boil-off of worm silk with an equal amount of tin or other metallic weighting. You will agree with us, I think, that no special amount of harm is done by a legitimate weighting of silk fabric, although in so far as dry cleaning is concerned, certainly no good is accomplished. In the excessive weighting to which the practice has grown in recent years, has come the great unfairness to the customers and to the drycleaner.

One of the most hopeful phases of the whole textile problem involved is the fact that practically without exception, the weighters and finishers of New Jersey have all agreed that this practice is against the best interests of all concerned, and have done their utmost to discontinue it. But we are dealing with problems of competition, and the ordinary cooperative methods which have been successful in other lines have failed utterly to bring any results in stopping excessive weighting or in putting a proper limitation upon it.

Two years ago at a series of meetings with the Better Business Bureau, the United States Bureau of Standards, the Silk Association of Dyers and Finishers, the Laundry Association, the National Retail Dry Goods Association, the Home Economics Society, and the National Association of Dyers and Cleaners, we arrived at a satisfactory outside limit of weighting of fifty per cent this is, one ounce of tin or other metallic weighting to one ounce of fabric—a fifty-fifty arrangement, so to speak.

Then came the lengthening of dresses and the use of a larger amount of material in a market in which both wholesale and retail prices had become firmly set. The cutting up trade was faced with either cutting the wages of employees or of cheapening the fabric. They tried the former, and the forty thousand parade, sabotage, murder resulted. They went back to the old scale of wages, and increased the percentage of weighting from fifty to as high as seventy-five per cent. This, I believe, still prevails in the cheaper fabrics.

Meanwhile, a new factor has entered the picture. Because of the agitation in certain circles against weighted silk, a few merchants insisted upon offering to the trade pure-dye silk as an unsatisfactory piece of merchandise, some pure dye or unweighted silk. The drape, the feel, and the appearance of heavily weighted silk when new, had been sold to the customer, and I am reliably informed that all over the United States the consumer now looks upon calls is sleazy, and turns it down.

Meantime, also, the dyers and cleaners have come to a philosophical viewpoint on this problem. We cannot change Eighth Avenue, New York City, so we must accept excessively weighted silk, not as a problem to be met and solved, but as a permanent condition of our business. We do not like it. We have estimated that it costs our people several million dollars a year in unfair claims, but in the present highly competitive commercial world, we are obliged to accept things as they are. Meantime, we should like to have this group (and without flattery, let me say that it is perhaps the most highly intelligent and openminded class of people to whom we have had the opportunity of presenting our problem in the textile field) clearly understand that the combination of tin salts and perspiration eventually breaks down the constantly decreased proportion of silk filaments, and that any manipulation of the garment, whether in the dry cleaners' hands or in the hands of the customer, or even on the shelf of the merchant, if it remains there long enough, will break a heavily weighted fabric. The chemical action involved may take place merely as a result of exposure to atmospheric moisture.

So much for weighted silk. We shall continue, of course, to clean it. In most instances, our members will continue to pay the customer something on account when it breaks in our hands, but we would like to have it clearly recognized by you and the merchants and manufacturers whom your influence reaches, that every dollar paid by a dyer and cleaner for a broken, heavily weighted silk dress is a tribute to Eighth Avenue, and to these days of excessive and unfair competition.

This reference to excessive and unfair competition brings up our other permanent problem. I have referred to it on two or three occasions in addresses to the dyers and finishers, and a year and a half ago in an article in the Journal of Commerce. That is, the practice of prestretching all types of fabrics which permit it. In this

*Presented at September Meeting of the New York Section.

connection an interesting story is told which best illustrates the ridiculous lengths to which this practice has been carried. I do not vouch for the truth of it, but perhaps it will help you to remember our point of view. A cutter-up telephoned to a finisher in New Jersey, more or less as follows:

"I am sending you a thousand yards of crepe, and I want fourteen hundred back."

"We can't do it. We have to have two hundred yards for ourselves, and that would make us stretch it to sixteen hundred yards. It will shrink to twelve hundred before it gets back across the Hudson River."

Tenter frames for pre-stretching are now used on crepes, georgettes, flannels, and it is now said to be extended into the men's suiting fields. We realize the temptation that is continually before a manufacturer, forced to meet a price, but eventually this practice is going to result in a swing away from cheap merchandise and unreliable concerns on the part, not only of the better merchants throughout the country, but the millions of consumers to whom we dyers and cleaners are constantly telling the story. We appreciate very much the attitude of certain manufacturers and finishers who are becoming known not only to the dyers and cleaners, but to some of the leading merchants in this country. It is our understanding that the United Piece Dye Works, of Lodi, New Jersey, has used every influence at its command to prevent the pre-stretching, particularly of crepes and georgettes, which it processes. Many of our members are willing to pay cheerfully for a shrunken crepe if they can be convinced that the fabric was originally processed by the United Piece Dye Works. Meantime, it should be definitely understood that there is nothing whatsoever in the drycleaning process, and with this fact you are all familiar, that would shrink a crepe or georgette or otherwise affect the fiber. Crepes rarely, if ever, have to be water-processed, and if they may not be steamed in the finishing process, then they cannot be finished at all. The application of a feather of steam is absolutely essential to a smoothly finished garment.

Here is what happens to a pre-stretched fabric. Woodward and Lothrop, the leading department store of Washington, D. C., sent us one a few weeks ago. It was a sample, 7⅝ by 5¼. Apparently all the pre-stretching had been done in one direction. After the first light steaming, it measured 6¼ by 5¼. It was steamed again, and it came down to 5¾ by 5¼. You will note that it retained its width. A final steaming made the sample perfectly square—5¼ by 5¼. It had lost 2½ inches in a lengthwise measurement of 7⅝. Imagine the temper of the customer who bought a garment made from this material, and her resentment, not only at the drycleaner, whom she would blame with the shrinkage, but also toward the merchant after the drycleaner had told her his story. It is important to remember that this sample had never gone through a cleaning process; that it was steamed only, and not excessively, at any time. There is nothing in the drycleaning process which should cause any garment to shrink or which should in any manner affect either the fiber or the color.

Apropos of the fastness of dyed fabrics to drycleaning, our Association spent several thousand dollars on a series of 382 tests to determine the fastness of dyed fabrics to drycleaning. This work was done in the United States Bureau of Standards, leisurely, carefully, by a capable gentleman who worked under the supervision of some of the best scientists in the Bureau. Here is a resume of the results obtained. Research conducted at the Bureau of Standards in 1928 and 1929 brought out the following facts. The 382 tests conducted on weighted silk, silk, wool, rayon, and cotton dyed with the following classes of dyestuff—direct dyes, acid dyes, acid mordant dyes, mordant dyes, basic dyes, sulphur dyes, developed dyes, and ice colors—show that the basic colors offer poor resistance to drycleaning. Only a few were unaffected by drycleaning solvent, and one or two were almost entirely removed. Also, practically all of the sulphur colors suffered alteration in shade.

Dyeings with acid, mordant, and acid-mordant colors were unaffected. About 75 per cent of the direct dyeings were unaffected by drycleaning. In no case were any of the direct dyes on weighted silks affected. Vat colors were unchanged. The ice and developed colors showed no change in shade in moisture-free solvent. Of the 26 samples of draperies, couch coverings, and cotton, linen, and jute casement covers, only three showed decided color change. The deductions from such tests are that on materials ordinarily sent to drycleaning plants only the basic dyes will cause any difficulty. Some difficulty in loss of color might be encountered with sulphur colors, but ordinarily the drycleaner obtains but comparatively few cotton or rayon fabrics dyed with this class of dyes.

This also brings up what seems to me to be the greatest opportunity for the exploitation of men's suit business by leading merchants, that has perhaps come to our attention in the last fifty years. I refer to the growing acceptance of summer suits in the heavily populated Northern section of the United States. This year was apparently the beginning of the golden flood of this business. Rudy Vallee appeared early in June, on the Pennsylvania Roof Garden, in a neatly tailored three-piece linen suit. Before the season was over, a very large percentage of his rapt audience from Oshkosh, Oelwein, Oskaloosa, from Kokomo, Kankakee, Kansas City, and Kalamazoo, were eating and drinking and listening and looking at Rudy Vallee, neatly and elegantly attired in a two or three-piece white linen, or as a last resort, perhaps in Nurotex suits.

Merchants and manufacturers of men's suits have long held the idea that drycleaners automatically limited their sale of garments. Far from affecting their business ad-

versely, it is the drycleaners who have taught America style and have made the neat appearing country-club type of young gentlemen possible at a limited expense. Were it not for drycleaners, low priced suits could not be sold and the only well dressed person in America would be the one who bought a suit of clothes the day before. Imagine the effect of that condition on the sales of clothing in general!

All of us have for years been intrigued by the immaculate freshness and elegance of a Don Rodriego or a Don Piedro of the tropics, attired in a freshly laundered white drill suit. Beyond the elegance of appearance that such garments impart, there i sthe impression of cleanliness and sanitation which is in step with the modern world. Next year a hundred summer suits can be sold to the population of the Northern half of the United States, where one was sold this year, if merchants and manufacturers will but observe a single point of common honesty: That they shall not shrink in either the drycleaning or laundering process. Three manufacturers—one in Nashville, one in Knoxville, and one in New Orleans—are now putting out white linens with their names below the statement on the label that they are guaranteed against shrinkage. It certainly cannot cost more than fifty cents per suit extra on the average, both for yardage and for the process to pre-shrink the fabric, and it makes the difference between having every customer a booster for the use of these garments, and having him damn everybody concerned, from the manufacturer down to his wife who made the mistake of ever sending that thing to a laundryowner or a drycleaner.

Never was such an opportunity open to the manufacturers and merchandisers of men's suits in the history of the United States. The vogue is here, knocking at the doors of every merchant handling men's clothing for 1932, and it means not one suit at $18, $20, $22, $25, but in the case of the better customers, perhaps as many as a dozen. Even trade association secretaries, in these troublous times, find some way to afford from 4 to 6 of these linen suits.

But let the merchants buy them from the manufacturers who gyp a half-yard on the cloth and a few cents in the pre-shrinking process, and this golden opportunity for profits and customer satisfaction will drift by and the merchant will still blame Hoover for the hard times.

Incidentally, can it be explained to this audience, if to no other, why linen summer suits should be drycleaned instead of laundered, even in the presence of our estimable friend, Mr. Johnson of the Laundryowners Association, that has accomplished so much for its membership and the general public? A great deal of the soil that any suit, whether wool or linen, picks up is of a greasy, oily nature. Certainly body soil is soluble in a dry solvent. If these garments are thrown directly into a wash wheel, as they are in all of the laundries which are *not* members of Mr. Johnson's association, their only method of removing that grease and oil and other soil that is not water-osluble, is by the use of mild alkalies or if they are in a hurry, even caustic soda itself. Strong suds and long time agitation in the wheel, and finally a Javelle water bleach and subsequent sours, are used. Every time such a garment goes through that process you have aged it at least a year and cuts its life at least in half.

Let us see the difference in the process used by the drycleaner. It is tossed into wheel, true enough. But a dry solvent is used instead of water, which immediately removes all of the solvent-soluble soils, grease, and oils. If there remain traces of water-born soil, sweet stains, or excessive perspiration, it is given a water treatment called wetcleaning, but what a vast difference between wetcleaning in a drycleaning plant and laundering in a wash wheel! The garment is spread out on the table, a concentrated soap solution made up with a neutral soap is applied by hand with a brush, in 99 out of 100 drycleaning plants, and it is a quick process. One minute brushing with the soap suds and a couple of minutes more in five quick rinses in which no sour is used to kill the soap. Your garment comes out as strong as when it left the factory and as clean and clear and sanitary as when it left the cotton boll or the flax field originally.

Furthermore, we regret to admit drycleaning of a summer suit nowadays costs no more than the laundering process. In fact, down in the South this summer we have had instances, as a result of a suicidal price war, where the laundryman was charging 75 cents and the drycleaner was cleaning the same white suits in superior fashion for a nickel. The average price charged across the Continent for drycleaning a summer suit is probably equal to or less than that charged by the more price-and-profit-minded laundryowners.

Two new problems have confronted the drycleaners recently that should be of interest to you. The market has been flooded this year with white shantung dresses. They are simple in lines, elegant in appearance, and economical in cost; but what a stir they have caused in the drycleaning world! We have not yet determined the exact reason, although we have spent considerable time and effort on it, why these garments, to the exclusion of all others, turn pink and green and blue in the drycleaning process. 382 tests in the United States Bureau of Standards in 1928 proved definitely that few dyes are fugitive in drycleaning solvent. If an exceedingly small percentage of all dyed garments bleed in the drycleaning process to any extent whatsoever, and if all white work—silks and wools—are run separately in separate washers, as is done in practically all drycleaning plants, how are we to explain by any pick up of color, the even, level, smooth tints of pink and blue and green, *mostly blue*, that these shantungs acquire in the 40-minute process they undergo in a perfectly inert drycleaning solvent? We confess we do not have the answer to the color problem on shantungs and we

ask you to concern yourselves with it at the earliest possible opportunity. We offer this theory: That these are not bleached whites because they apparently contain wild silk which we understand does not yield to the bleaching process, but they have been topped by certain colors to overcome certain others and produce a white effect. We offer this statement only in our defense: That these garments are also changing colors on the merchants' shelves.

The other new problem that drycleaners have had to contend with lately, is the stretching of knit fabrics, especially bouclé. Just recently a case was called to our attention where the leading ladies' ready-to-wear store in the city of Washington had sold a tailored suit of this fabric. In less than 3 weeks it had stretched more than 3 inches in length. The garment had never been cleaned or even pressed. Through its research department, the National Association of Dyers and Cleaners has been fortunate to evolve a satisfactory method for restoring fabrics of this kind. The yarns are not actually shrunk. The fabric must be wet out, either with a feather of steam or by immersing in water, and then the knit built back into its original shape. This is either done on a steam board or by building it in especially constructed trays in the dry-room and allowing them to dry without any strain upon the fabric; in the case of heavier knit fabrics, by tumbling them for a few minutes in a cold revolving tumbler.

The research department of our Association is constantly searching for new problems. To date our only method of finding them has been through the sad experiences of some of our members who were thoughtful enough to send them to us, and from the occasional department store that has developed sufficient conscience to be interested in the maintenance of its merchandise after it gets into the hands of the consumer.

And here let us make an analogy and the point of this message. Every automobile manufacturer in America who did not provide service stations and replacement parts at frequent convenient points throughout the entire Continent, has gone out of business in the last 10 years. Haynes, it is said, made the first automobile; Haynes made a good automobile; Haynes made a good looking automobile; but when something went wrong with a Haynes there was no place to have it fixed; there is no Haynes car today.

So manufacturers of fabrics will eventually decide to at least take the service station which maintains its product in consumer use, into consideration when launching a fabric—and I predict that a day will arrive when a constant stream of samples either in yardage or in the finished garment itself, will be flowing back and forth between New York City and Silver Spring, Md.

Chairman Gaede: Thank you, Mr. Trimble.

Are there any questions anyone would like to ask Mr. Trimble?

Mr. Freedman: Mr. Chairman, I would like to ask Mr. Trimble whether the dry cleaners use any wet wash methods in their operation.

Mr. Trimble: All dry cleaners use the process of wet cleaning. There is no method of removing a water borne soil from a garment except by the liquid or the type of liquid that carried it in. Perspiration cannot be taken out of a garment very successfully by dry cleaning, especially if the garment has been allowed to hang any length of time. But wet cleaning in a dry cleaning plant is an entirely different process than laundering.

It is not done in a wheel. It is done by hand. In fact, that is the entire basis of the difference between dry cleaning and laundering. If it were not for that, the price of all dry cleaning would be equivalent to or lower than the laundry prices, given the relative efficiencies involved. But a dry cleaning plant connected with a laundry sets up a constant temptation to the man in charge to take this garment, which in a straight dry cleaning plant would be handled by hand, over and dump it into the laundry wheel. And that is as near as I can answer your question.

Mr. Freedman: When that is done, doesn't that result now and then in a fading of the color, of the dyestuff in the garment?

Mr. Trimble: Yes, it does.

Mr. Freedman: The reason I raise this question is that customers frequently say, "Well, I had this garment dry cleaned," and the customer's idea of dry cleaning is the use of benzine, naphtha, or gasoline. I doubt if one in a thousand know that a dry cleaner has occasion to use wash methods at times. I am wondering whether your Association ought to make that a little clearer to the public. Isn't the term "dry cleaning" somewhat of a misnomer at the present time?

Mr. Trimble: It is. You feel that more possibly in New York and Chicago and Philadelphia than any place else on the continent. The average better dry cleaner—not all of them by any means, not half of them—will quite religiously call up the customer, if he is dealing with the customer direct, and say, "We have dry cleaned your garment, Mrs. Jones, but there is soil in that garment that we cannot remove by that process. We therefore want to wet clean the garment but will do so only at your risk or with your permission."

In cases of that sort we rarely have expressions of dissatisfaction. We may have the dissatisfaction but it very seldom reflects back on the dry cleaner.

To explain that to the American public would be quite a job, Mr. Freedman, and the only way it can be done, it seems to me, is through a campaign of national educational advertising which we may get to presently.

Mr. Freedman: Isn't that one of the reasons for the higher cost of dry cleaning, and if all dry cleaners used that method and treated their garments without calling the

customers, as many of them do not, wouldn't it mean a higher cost to the customer than it does ordinarily?

Mr. Trimble: Yes. A garment that is wet cleaned in a dry cleaning plant has always been dry claned previously and that just doubles or trebles the cost involved. It is so much harder to finish a garment that has been wet cleaned than one that has been dry cleaned.

It doesn't cost half as much, Mr. Freedman, not more than 40 per cent as much to dry clean and finish that woolen suit that you are wearing as to handle a linen suit of the same type which must be first cleaned, then wet cleaned, and then finished in a more difficult fashion.

Chairman Gaede: Are there any more questions?

Mr. Kennedy: What method do you usually use for dry cleaning Celanese that is dyed with Anthraquinone derivative colors?

Mr. Trimble: Dodging the question, and just making a statement, I think that practically all of the better dry cleaners of the United States would rather have Celanese to dry clean than any other type of fabric, now that we have learned the difference between it and silk and rayon. It is very easily spotted. Ninety-nine out of a hundred stains on Celanese can be removed by just a brush and a little bit of water, or benzine, and soap. We have no trouble whatsoever with colors in Celanese. It is one of the nicest and most inexpensive things to handle in the whole fabric field.

Does that answer your question?

Mr. Kennedy: Somewhat. How about Anthraquinone derivative colors dyed on there? Don't they bleed?

Mr. Trimble: I wish I knew what kind of colors those were. (Laughter)

Mr. Kennedy: They are Celanese colors.

Mr. Trimble: That is the only type of color that we get in our plants, if the garment has not been converted over to the rayon type and then dyed with the ordinary dyes that you would use on rayon. But we have no difficulty with those colors.

Member: There are so many different dyestuffs used in dyeing Celanese, and some of the plants are using benzol, some of them even gasoline. That is the point Mr. Kennedy wants to bring up.

Mr. Trimble: We have had no trouble of that sort in plants connected with the Association. Just now we are having an invasion into the dry cleaning field of trichlorethyl. That seems to let Celanese colors loose, especially if they are imported Celanese fabrics coming from either France or England, particularly from France. But a very careful study of that very thing in a plant at Philadelphia recently revealed no trouble with the American Celanese acetate fibers. It doesn't matter whether it is made by the Celanese company or by the other companies.

Still I don't know whether I have answered your question. I am not trying to dodge it.

Mr. Kennedy: That covers it somewhat. I had in mind where there is a mixture of goods nowadays for men's linings of Viscose and acetate.

Mr. Trimble: We are having plenty of difficulty with that in some wholesale plants particularly. The plants that do work for the tailors still adhere to chloroform and have positive solvents in removing spots and stains and when they apply chloroform to those linings, that are either part Celanese or all Celanese, they simply have to buy a new lining.

There is no reason why they should do that, however, because all of them have had access to all of that information continuously for a period of more than four years—those that can read. (Laughter)

Mr. Thompson: I think it is only fair to let us hear from Mr. Johnson on summer clothing because that is really a coming problem. Perhaps he has some ideas on that.

Chairman Gaede: Mr. Johnson?

Mr. Johnson: There is nothing I can add, gentlemen. Still, I want to point out that they are called washsuits. (Laughter)

Mr. Trimble: I believe that nomenclature was applied by the Laundryowners Association. (Laughter)

Mr. Johnson: Seriously, gentlemen, the point that Mr. Trimble brings out is an interesting one. We will agree with him up to a certain point. There are certain types of woolens which properly must be handled in a dry cleaning plant. We are the first to admit it. But we won't hesitate a moment to say that a linen suit can be washed. In other words, Mr. Trimble mentions the fact that it takes a solvent to dissolve certain greases. Soap will emulsify those grease spots. If it will take them out of a tablecloth, it will take them out of a linen suit.

Mr. Trimble: Except that you don't sit on an automobile wheel with a tablecloth. (Laughter)

I do not want any false impressions to get out of this very interesting little tit-for-tat discussion. We consider the Laundryowners Association one of the very finest trade associations in the United States and for the past five years, through Mr. Stutz and myself, we have been working in perfect harmony with them. I could not resist the temptation to put up just a little counter-propaganda on the subject of summer suits and to insist that while 10,000 Chinamen can't be wrong, yet a few dry cleaners may be right. (Laughter)

Chairman Gaede: Does anyone wish to ask Mr. Trimble or Mr. Johnson any further questions?

Dr. Jos. F. X. Harold: I should like to ask if Mr. Trimble believes by this time the dry cleaning method for cleaning furs has justified itself.

Mr. Trimble: Absolutely. (Laughter)

I want to go clear out of the realm of the technical for just a moment, if you will indulge me, Mr. Chairman. That brings up a subject that is close to my heart.

There are a great many men in this audience whose

memory goes back to the 90's when the Linotype machine came into existence, and if you will pick up handbills and union statements of those days put out by the hand type setters, all you would have to do would be to change a word here and there to get all of the propaganda that has been put out by the furriers. You remember they said that the type cast in a slug by a machine would cut the paper and that your paper would fall apart in your hands while you were reading it; that you couldn't preserve any of this valuable material coming out in the daily press for future generations, and all that sort of thing.

The question is an economic one, pure and simple, not technical, and it has nothing to do with the life of the fur.

I will fill this room within forty-eight hours with furs that have been cleaned fifty or one hundred times, or I will take any good fur and take it down to Silver Spring, in the presence of any sort of committee (if that were necessary) and clean it and give it any reasonable test under the sun, and it will not damage the fur, except as it may be handled. Manipulation comes into the picture whether you dry clean garments or dry clean furs.

In all of this furrier-dry cleaner controversy that has been going on for the last two or three years, and which each spring waxes a little more vitriolic and a little more eloquent, you will notice that only on perhaps one occasion (and that was a mistake) have we ever replied to it through the textile trade journals or public press. There is no reason for our putting up a defense. Fur garments, gentlemen, are rolling into the dry cleaning plants of America in a golden flood, too fast for us to keep up with them during the comparatively short season in which they come to us.

One defect in the dry cleaner's practice must be admitted as of four years ago. Gradually through the medium of these 750 young men who have passed through our Institute in the last three and three-quarter years and through state conventions and lectures, and every possible method we have of reaching the dry cleaners, we have taught them to cut down their heat in the drying process. If furs are dried at a temperature not to exceed 115 or 120 degrees they will be better and stronger after the dry cleaning process than they were before, and we can prove that to you from sources which you will not question, and they will be infinitely more sanitary.

Which would you rather have your wife wear, a fur with the natural animal lubrication in it that comes from an anthrax infested Persian sheep, or one in which that lubrication is supplied by a perfectly sterile mineral oil, paraffin? Answer it for yourselves. (Laughter)

Dr. Harold: I belong to the Technical Association of the Fur Industry as well as to this Association and I would like to give Mr. Trimble what might be called the local point of view.

I think he will agree with me that perhaps I may be wholly wrong but the local furriers who sell very largely the furriers of the country are rather committed or still in love with the old-fashioned method of fur cleaning.

I would like to know if Mr. Trimble meant to be taken exactly when he said that he would be willing to submit these furs to any test under the sun, or in this room. He said I believe he could bring thousands of furs into this room and prove they were better than those handled by the old method. I am afraid that he was joking when he said "under the sun" and "in this room." (Laughter) You want furs to stand up in cold weather outdoors, with the friction of the body and the frequent bending of the body, and it doesn't seem to me that hard paraffin wax is the ideal thing to replace the horribly infested oils (laughter) that for some reason or other he believes to be still infested even after they have passed through bichromate and hydrogen peroxide. Do you really believe that paraffin is as good as the natural oils that are given to the fur?

Mr. Trimble: I don't want to be taken literally. Perhaps some of those statements I made were the result of constant teasing on that subject, but I want to invite the gentleman's attention to this one point: that millions of gallons of gasoline are used in the fur processes before the fur is manufactured into a garment, in degreasing the pelts and hides and skins. If gasoline does so much harm in a dry cleaning plant, why doesn't it do some harm in that process?

One other point: I wish I had brought a number of samples with me. I purposely kept away from this subject tonight because it is hardly in the field of textile chemistry and coloring, but here again is an analogy: Mrs. Jones of the avenue goes to Florida each winter. She may spend six or eight weeks slowly gathering a beautiful bronze coat of tan. But Mrs. Smith who lives a few blocks away, possibly across the railroad tracks, goes to Florida for three or four days. She disrobes out on the beach and acquires that coat of tan in two applications of about six hours each and with it a magnificent sunburn. Her skin is burned often to a crisp. This happens in Florida every winter.

The great trouble with handling furs, whether they be handled by the furriers or by dry cleaners, is the new quick process of tannage.

Some years ago a pelt went into the tanning process and stayed there anywhere from six weeks to three or four months. Now right here in New York City, and right in the middle of the fur season, you can drive a flock of muskrats down there of an even and they will drive you back a fur coat the next morning (laughter), and it won't be a muskrat coat. It will be a seal coat (laughter). They use sulphuric acid in the tanning process and it is a quick, a burning process.

To carry that out just a little further, shoe manufacturers in this country are sometimes compelled to replace

complete factory runs of shoes because the soles are acid burnt in exactly the same fashion that the fur tanners overburn their pelts.

That is the trouble in the whole fur cleaning picture today.

We have no complaint to make, sir, against the furriers, nor have we ever made any. We made the mistake of answer one once. (Laughter)

If that one think were corrected, their method of tannage, there would be no dissatisfaction from the consumer's standpoint at all, but I don't believe it can be argued by anyone that the so-called furriers' method of cleaning, which is purely a superficial one, purely a dusting process, is a cleansing process at all, and the proper place to argue this whole question out is not before textile chemists and colorists or before merchants but before the Department of Public Health. (Laughter)

Chairman Gaede: Are there any further questions? If not, I will ask for a rising vote of thanks to Mr. Johnson and Mr. Trimble who presented two very excellent papers tonight, and I am sure that we have all learned a few things which we didn't know before.

. . . A rising vote of thanks was extended to the speakers of the evening . . . (Applause)

. . . The meeting thereupon adjourned at ten o'clock . . .

Identification of Sizing and Finishing Materials*

Tentative Report on Sub-Committee on Standard Methods of Determining Sizing and Finishing Materials in Textile Fabrics, Including Silk Weighting

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THE materials used in sizing and finishing are applied for two primary purposes: either to protect the fiber and aid in the manufacturing processes or to impart certain physical and chemical properties to the finished material. Many different substances are employed in the sizing and finishing processes and the present tendency points to a still wider range of materials being used, especially in the production of new and novel finishes.

The size and finish in fabrics in many instances is of a complicated composition. At the present time sizes and finishes are very apt to contain new and unusual materials that are out of the general run of the common sizing and finishing compounds ordinarily employed. It is practically impossible, therefore, to outline a systematic qualitative and quantitative analytical procedure for detecting and determining all the possible materials that could be used.

In a majority of cases finished cloth has only a slight coating or impregnation of the finishing materials and this makes it extremely difficult to obtain enough of the finishing ingredients to work with analytically. In many instances some of the sizing or finishing ingredients used cannot be detected or determined by ordinary analytical procedures. It then becomes necessary to develop special methods of analysis. Furthermore, in the case of dyed and printed fabrics extracted coloring matter may interfere with some of the tests and the presence of mordants must also be kept in mind in the interpretation of results.

A qualitative analysis should first be made to determine the materials employed for sizing or finishing and subsequently the proportions of the various ingredients may be quantitatively estimated if desired.

The following is a working sequence for the qualitative detection of the most important sizing and finishing materials commonly found in textile fabrics:

1. PRELIMINARY EXAMINATION

Prior to making any chemical examination of the sample, it should first be carefully examined for appearance and handle. The binocular microscope or strong magnifying glass oftentimes discloses the presence of mineral fillers and other helpful information in regard to the nature of the dressing in the case of finished fabrics. One can usually very readily tell by such an examination whether it is a so-called pure finish, assisted finish or stiffened finish.

There is no sharp line of demarcation between a pure and an assisted finish. These finishes are closely related. An assisted finish is one that is obtained by a light application of some stiffening agent, usually starch, to bring out or enhance the full effect of the mechanical finishing operations or to assist in the retention of these effects. Stiffened finishes are those produced by the addition of

*This report is entirely provisional and is not for republication elsewhere in its present form.

stiffening, binding, filling and weighting agents and their presence is far less disguised than in the case of assisted finishes. In the case of heavy filled goods the cloth is more often disguised than the filling materials. If heavily dressed it will feel hard and stiff. The appearance of dust when the sample is torn usually indicates loading Burning a piece of the sample and noting the way it burns and the odor often gives a clue as to the nature of some of the materials used. Casein, gelatine and glue, if present in appreciable amounts emit the characteristic odor of burning protein, while Latex, which is one of the less common finishing materials, can be readily recognized by the odor of burning rubber.

2. Softeners

If preliminary examination indicates a very light sizing or dressing, a much larger sample should be used for testing than in the case of a heavily sized or filled fabric. Nevertheless it is always advisable to take as large a sample as can be conveniently worked.

(*a*) *Oils, Fats and Waxes.* Extract the dried sample with carbon tetrachloride[1] to remove oils, fats and certain waxes. If the extracted material is appreciable, it may be analyzed by regular analytical procedures. Should an analysis be essential, a sufficient amount of the sample must be extracted to yield 3 or 4 grams of extract.

(*b*) *Soaps.* Air-dry the solvent-extracted sample of cloth, then moisten with water and test for acid or alkaline reaction with litmus paper. Place the cloth in about twenty times its weight of distilled water. If necessary neutralize with dilute acetic acid or Na_2CO_3 and then boil for one-half hour, adding water to make up for evaporation. Pour off and save the extract. Repeat the boiling with distilled water twice and then rinse with boiling water until the rinsings are clear. Combine the extracts and rinsings and let settle. Decant the supernatant liquor, if clear, otherwise filter on a Buchner funnel by suction. Any insoluble suspended matter in the water solution may consist of insoluble mineral loading and filling materials such as China clay, talc., gypsum, etc., also some starch and albumen.

Boil down a portion of the combined hot water extract in a small beaker or test tube and acidulate with dilute hydrochloric acid. A turbidity which disappears upon boiling, giving place to oily drops indicates the presence of soap.[2] If desired the fatty acids may be extracted with ether by shaking out in a small separatory funnel.

(*c*) *Sulphonated Oils.* Boil the acidulated aqueous extract from the above test for a few minutes, filter and to the filtrate add an excess of barium chloride solution. Continue boiling for two or three minutes and filter off any precipitate that may have formed. Evaporate the filtrate to dryness and ignite the residue, dissolve in water, add one or two drops of bromine water, acidify with hydrochloric acid and boil. A white precipitate of barium sulphate remaining insoluble indicates the presence of sulphonated oil.

3. Deliquescents

The following procedure will serve to identify the more commonly used organic and mineral deliquescents in the sizing and finishing of textile fabrics. Among the organic compounds employed are dextrin, glucose, and glycerine, the latter being the most common for this purpose. Among the most modern organic deliquescents that may be employed as substitutes for glycerine are the ethylene and diethylene glycols, more especially the latter which is extremely hygroscopic. The mineral deliquescents employed are chlorides of calcium, magnesium and zinc. The latter, however, is more frequently used as an antiseptic, especially in warp sizing. Both Epsom and Glauber's salts are also used. Epsom salts has also the advantage of possessing considerable filling properties.

(*a*) *Dextrin.* Steep a portion of the original sample in about 20 times its weight of cold (not over 20° C.) distilled water for 1-2 hours with frequent stirring. Let settle and filter off the solution, using a Buchner funnel, if necessary. Test the filtered solution for dextrin by the addition of a drop of dilute iodine solution (1:1000). A reddish violet or brown coloration indicates dextrin. The more the coloration tends towards brown the more highly converted was the dextrin employed.

(*b*) *Glucose.* Boil down a large portion of the hot water extract in a beaker and then transfer to an evaporating dish and evaporate almost to dryness on a water or steam bath. Dilute a few drops of the concentrated extract with water, add several drops of mixed Fehling's solution until the mixture stays permanently blue, then warm. If glucose is present a yellow or red precipitate (cuprous oxide or hydroxide) separates out at once. Dextrins do not give the reaction at once, but only after standing some time or if boiled. If the quantity of glucose present is very small, it may merely produce a green or yellow opalescence in the solution.

(*c*) *Cane Sugar.* Boil the solution used in the Glucose text and filter. Make the filtrate acid with dilute sulfuric acid (3-5 cc.) and boil for 10 minutes. Dilute to the original volume with distilled water, if necessary; then neutralize with caustic soda. Add Fehling's solution drop by drop till permanently blue and boil again for two minutes. The formation of a cuprous oxide precipitate indicates cane sugar.

Optional Tests for Cane Sugar

(1) Cobalt Nitrate Test. Dilute a few cc. of the concentrated extract prepared for the glucose test to about 15 cc. with distilled water. If the solution contains dextrin or gums, these must be removed by treatment with alcohol and the solution filtered. To the filtered solution add 5 cc. of Cobalt Nitrate solution and 2 cc. of potassium hydroxide solution. Cane sugar produces under

these conditions a permanent amethyst-blue color, while dextrose gives at first a Turquoise-blue passing over into light green. In a mixture of the two sugars the color due to cane sugar will predominate.

The reagents referred to in the above tests are prepared as follows:

Fehling's Solution. Mix just before use, equal volumes of the Soxhlet modification of Fehling's copper solution and Fehling's alkaline tartrate solution, the formulas of which are as follows:

(*a*) *Copper Solution.* Dissolve 69.28 grams of $CuSO_4.5H_2O$ in water, dilute to one liter and filter through prepared asbestos.

(*b*) *Alkaline Tartrate Solution.* Dissolve 346 grams of Rochelle salts (NaK tartrate) and 100 grams of caustic soda in water; dilute to one liter, let stand for two days and filter through prepared asbestos.

Cobalt Nitrate Solution. 5% solution in water.

Potassium Hydroxide Solution. 50% solution in water.

(2) Alpha-naphthol Test. Introduce into a test tube a few drops of the concentrated water extract prepared for the glucose test, add 4 or 5 drops of 20% solution of alpha-naphthol in alcohol and 2 cc. of water; shake well, tip the tube and let 2-5 cc. of colorless concentrated H_2SO_4 flow down the side. Then hold the tube upright. If cane sugar is present, a color varying from a faint to a deep violet will occur at the junction of the two liquids. On shaking, the whole solution becomes a blue violet color.[3]

(*d*) *Glycerine.* Evaporate 100 cc. or more of the hot water extract almost to dryness. Transfer to a 50 cc. Pyrex Erlenmeyer flask, add a few crystals of $KHSO_4$ and evaporate to dryness. Insert stopper with glass tube, then heat strongly, passing gas evolved into Schiff's reagent in a test tube. Continue heating for 5-10 minutes. If glycerine is present, Schiff's reagent will gradually become colored, pink to purple. Heat the test tube in hot water together with a second tube containing the colorless reagent. As the tubes become hot, color will develop in both, the one testing for glycerine should be more purplish. Cool. The blank will become almost colorless; that of the test will become less purplish, but the color will not fade out as the blank.

Schiff's Reagent. Dissolve one gram of fuchsine in 1000 cc. of water. Dilute 150 cc. of this solution to 1000 cc. and pass in SO_2 until the solution is almost completely decolorized. On standing it becomes colorless. Another method of preparation of this solution is to mix 50 cc. of a 1% fuchsine solution with 250 cc. of water and add 20 cc. of a 4° Be. sodium sulfite solution and 2 cc. of concentrated sulfuric acid.

(*e*) *Ethylene and Diethylene Glycol.* Evaporate a small portion of the concentrated hot water extract with potassium bisulphate almost to dryness. If ethylene or diethylene glycol are present, acetaldehyde is formed which can be recognized by its characteristic odor. Ethylene and Diethylene Glycol also give the same test as glycerine does with Schiff's Reagent except they do not develop the indigo blue coloration upon heating.

(*f*) *Mineral Deliquescents.*[4] On another portion of the filtered hot water extract test for the presence of zinc, calcium, magnesium and sodium by the usual qualitative procedure.

Test another portion for chlorides and sulfates. If a heavy precipitate is obtained in the test for sulfates, the presence of Epsom Salts or Glauber's Salts is indicated, the probability being that it is Epsom Salts.

4. Agglutinants

In general all these materials with the exception of starch, present in most cases no definite chemical properties by which they can be recognized. Their presence can only be more or less inferred by applying numerous qualitative tests with different chemical reagents.

(*a*) *Starch.* Cool a small portion of the hot water extract and test with a dilute solution of iodine (1:1000). A blue color indicates starch.[5]

(*b*) *Albumen (Egg and Blood).* This test is made directly on the original sample of cloth, first by warming with Adamkiewicz reagent. A reddish violet color is produced if egg albumen is present. Blood albumen gives no reaction with this reagent but reacts with Millon's reagent. Egg albumen gives a reaction with both reagents.

Test for blood albumen by boiling the sample with Millon's reagent. If present, a pink or red coloration is produced.

Note: The reagents are made as follows:

Adamkiewicz' reagent: Pour 1 part by volume on conc. H_2SO_4 into 2 parts by volume of Glacial Acetic Acid.

Millon's reagent: Treat 20 grams of mercury on a water bath with 40 grams of HNO_3 until just completely dissolved. Then let stand 24 hours (not longer) and pour off from the precipitate.

(*c*) *Casein.* Boil 1 or 2 square inches of the original sample with 5 cc. of water to which is added 5 drops of dilute H_2SO_4. Decant the liquid from the fabric into a test tube, cool and add 1 drop (not more) of 3% formaldehyde. Mix and pour this solution gently down the side of an inclined test tube containing 2 cc. of conc. H_2SO_4 to which has been added 1 drop only of 10% $FeCl_3$ solution, taking care that the water solution flows on the top of the H_2SO_4 without mixing with it. If casein is present, a violet ring forms at the junction of the liquids. Glue does not give more than a brownish color. A blank test should be conducted, using a small amount of casein, or preferably a piece of cloth which has been treated with casein.

(*d*) *Gums (Tragacanth, Tragasol, Mucilages, etc.).* To

a large portion of the concentrated hot water extract add basic lead acetate solution until no more precipitate forms, and filter. This treatment precipitates Tragacanth, Tragasol, Gum Arabic, Irish moss (mucilages) and albumen but not glue, gelatine, starch or dextrin. It is practically impossible to accurately distinguish the different gums.

Note: *Basic lead acetate*: 3 parts sugar of lead, 1 part litharge, ½ part water, stirred on water bath until solution becomes white, then stir in 10 parts water. Let settle and filter.

(*c*) *Test for Glue and Gelatine*. Boil another portion of the hot water extract and add 1 drop of acetic or 2 drops of nitric acid. Boil again and filter off any precipitate (albumen). Make the filtrate slightly alkaline and add 3 drops of Fehling's solution and warm. If glue or gelatine is present, a violet coloration will appear. Confirm the reaction by adding a few drops of strong tannin solution to another portion of the hot water extract. A turbid appearance or clotted precipitate indicates glue. Albumen (blood albumen) gives only a slight turbidity with tannin solution; starch and mucilages give precipitates. Only the precipitate with glue is partly soluble in dilute HCl, the others are not. Starch does not give any coloration with Fehling's solution.

Note: *Tannin Solution*: Dissolve 10 grams of common salt in 100 cc. of water, and then nearly saturate with tannic acid (U.S.P. grade). Filter before using.

5. Mineral Loading or Filling Materials

Ignite a suitable sized piece of the original sample until all organic matter has burned off. The ash if appreciable may then be analyzed for mineral loading matter by the usual qualitative tests.

The table below shows the reactions with various chemical reagents of the gums and other stiffening and adhesive materials commonly used in sizing and finishing and may prove of assistance in conjunction with the tests outlined above for the identification of these materials.

Chemical Reaction of Sizing and Finishing Materials

	Alcohol	Basic Acetate of Lead	Fehling's Solution	Tannin Solution (5:100)	Dilute Nitric Acid	Dilute Sulfuric Acid	Iodine Solution (1:1000)
Gum Tragasol	White gelatinous precipitate	White opaque gelatinous mass	Blue gelatinous precipitate. No reduction on heating	Buff colored coagulum	No reaction cold, on heating becomes thinner and mucic acid is formed	No reaction cold, on heating hydrolyzed to reducing sugar	No reaction
Gum Tragacanth	An excess of strong alcohol throws down a thready white precipitate	As above	Limpid blue solution	No action	On boiling yields mucic acid	.....	Usually a faint violet coloration owing to the presence of a trace of starch
Gum Arabic	5 to 6 volumes of strong alcohol precipitates it in concentrated solution. Dilute solution becomes turbid	White gelatinous precipitate	No change even on boiling, but on shaking up with soda lye a flocculent bluish white precipitate	No action	On boiling yields mucic acid	After long boiling formation of sugars reducing Fehling's solution	No action
Irish Moss and similar bodies (mucilages)	The aqueous solution gives a flocculent or gelatinous precipitate with excess of alcohol	Precipitate	.....	Irish Moss becomes turbid. Agar Agar gives a flocculent precipitate on addition of hydrochloric acid. Linseed mucilage is at first limpid, but turns turbid on addition of hydrochloric acid	.....	.....	On boiling there is sometimes a violet coloration owing to the presence of a trace of starch
Glue and Gelatine	Concentrated solutions give an abundant viscous precipitate. Weak solutions turn turbid	Very concentrated solutions turn turbid	Violet coloration	With a neutral or slightly acid solution gives a clotted mass	.....	On boiling converted into glycocoll, etc.	No action
Albumen Solution	Excess of alcohol coagulates it	Turbidity or white precipitate	Added drop by drop produces violet coloration	An excess gives an abundant precipitate	Pour in carefully so as to form a layer over the albumen solution. A white ring is formed at the point of contact	Coagulated	.....
Starch and Flour	Abundant white precipitate	Turbid	No action	Milky white turbidity or precipitate	.....	In aqueous solution glucose forms on boiling	Blue coloration disappearing on heating
Dextrin	Five to six times its volume of alcohol precipitates it as a pasty mass on the sides of the vessel	.....	With dilute solutions no change on boiling. With concentrated solutions heating or boiling separate out red copper oxide	With dilute solutions no change. With concentrated solutions white turbidity increasing by hydrochloric acid	.....	.....	Purple, red or brown coloration disappearing on heating

From "Tragasol" and its uses, by the Gum Tragasol Supply Co., Ltd., Hooton, by Chester, England, pp. 12 15, inc.

NOTES

[1]Chloroform, petroleum ether, or benzol may also be used.

[2]Note: Sulphonated oil will give the same test. Where both soap and sulphonated oil are present it is very difficult to determine the presence of soap under such conditions, but in the majority of cases this is not essential.

[3]Note: This test is suitable for the purpose here specified but it should be understood that other substances besides cane sugar give this color reaction.

[4]Accompanying this report will be found a tabulation of characteristic reactions of different agglutinants as originally published by the Gum Tragasol Supply Co., Hooton, England.

[5]Note: An excess of iodine or the presence of a comparatively large amount of dextrin may mask the blue color. If N/10 thiosulphate solution is added drop by drop to the discharge of color, if starch is present a very distinct blue coloration is apparent just before the color is discharged.

MEETING OF SOUTH-EASTERN SECTION

A MEETING of the newly formed South-Eastern Section was held at Columbus, Ga., on Oct. 3, 1931. Papers were presented by H. H. Field on "Cutting Costs in the Dye House." R. S. Wheeler on "Bleaching and Dyeing of Cotton Piece Goods."

Mr. E. A. Feimster, Jr., Chairman, introduced Mr. R. S. Wheeler, who gave a very interesting paper on bleachery control. Mr. W. C. Jackson, Superintendent of Lowell Bleachery South No. 1, led the mill men in discussion.

There were forty-five mill chemists, dyers and mill officials present.

Cutting Costs in the Dye House

By **H. H. FIELD**

THE subject of cost is one of paramount interest to mill men, especially at the present time, and should be of very great interest to all dyers. It seems fittingly proper that this should be one of our subjects for discussion at this meeting, as heretofore in former meetings it has been neglected to a large extent.

The reduction of cost can be discussed from many angles, particularly in dyeing. Therefore, we will divide this discussion into three separate heads, namely: Dyestuffs and Chemicals, Equipment, and Labor. Under the heading of Dyestuffs and Chemicals, one of the most important things to consider is the proper selection of these materials for your own particular use, and your various methods of application.

For examples, using sulphur color, as illustration, on piece dyeing it is of utmost importance that colors which will exhaust uniformly and have a strong exhaust be used to insure against a drop of exhaust is still essential to secure an even shade throughout the package or beam. The same requirements will apply to rawstock. If dyestuffs and chemicals are selected with an eye to such requirement as just referred to, and to the many other requirements these materials should meet, much money can be saved for the mill. However, if they are selected without thorough tests being run, much money can be needlessly lost.

A well equipped laboratory with a competent man in charge will pay for itself in a short while, and will mean a large saving to any mill regardless of size, if run on a scientific scale. In this laboratory, product samples of the different dyestuff and chemicals concerns can be kept, and when desired, tests may be run to determine, money value, and quality, on dyes, fastness, exhaust, effect of after-treatment, change on aging, etc. This abolishes to a great extent, the very costly method of running tests on a large scale in the mill on products of which the quality is unknown. The varying conditions from laboratory to mill make it necessary that these large scale tests be run at times to make sure that the product will meet your local conditions. However, the laboratory can weed out the products which will not be satisfactory at all, and these mill tests need only be run on the products that from the lab test show promise of value to the mill.

The mill laboratory will do much to reduce the cost on dyestuffs and chemicals, and the mills which at the present are not equipped with one, and later install it are in for a very agreeable surprise.

The equipment of the dye house is naturally a large item in the reduction of cost. Some mills are more fortunate than others, in that their equipment is more modern and up-to-date than the less fortunate. Regardless of that, however, there is much food for thought in the upkeep of the equipment, and adding to the machines any devices which will be labor savers and will improve quality, such as air and electric hoists, etc. There are numerous devices of this kind which, if adapted to the mills' needs will be a big item in cost reduction.

However, the actual upkeep of equipment is an item which will determine to a huge extent the amount of saving in your dyehouse. If equipment is kept in good running condition at all times the chances for breakdowns and poor work are decreased greatly. However,

if upkeep is neglected only poor work and costly losses of time due to breakdowns can be expected. This applies especially to operations such as piece dyeing, desizing, etc. It is a well known fact that unless the rolls on these machines are kept in perfect alignment, and the surface of the rolls smooth, that the result will be torn and wrinkled cloth, and uneven dyeing. However, the other forms of dyeing should not be neglected in the matter of upkeep. There are numerous things to be kept in good condition, valves, pumps, packing in pumps, in lids, etc.

Cleanliness should be a big item in every dye house, for it goes hand in hand with cost reduction. Even when running the operators should be on the alert and prepared to clean up in any spare moments they may have. A good policy is to stop off production at the end of the week early enough to get a good clean-up from top to bottom, missing nothing. Much material can be ruined through failure to keep the equipment and plant as a whole clean, and this falls right in line with other things to give cost a good hard push up.

The reduction and control of labor cost is a much more difficult problem than it seems to be without examination, especially so in dyeing In the dye house the operator must be a man of good intelligence, and must be well acquainted with, and well versed on, his job. Therefore, the idea of replacing trained men for cheaper and untrained men is not logical in the dye house. Of course, these untrained men may have as much intelligence as the trained worker, but the cost of training him, and the cost of his mistakes will overshadow the saving in the employment of the untrained man.

Reduction of labor cost in the dye house requires systematic and well worked out plans. Nothing can be more detrimental to quality and production than a haphazard attempt at labor cost reductions, and with a sacrifice of production, cost cannot go down, and with quality impaired, the cost is greater than the gain.

Yet it is surprising how a well executed plan can cut the force on the job, hold up production and quality, and consequently lower labor cost. As an example, we will take the results achieved in one of the dye houses at our plant. In a year's time the number of men employed was reduced considerably while the production did not lose but gained slightly. The cost of labor per pound was reduced approximately 10% more than the reduction in force formerly used. The results were indeed surprising. We knew that we could cut, but did not realize until we began planning and working just how much could be cut. Before these men were dispensed with it seemed that everyone on the payroll had a full job. Yet upon closer investigation we found that some of them had a great deal of spare time, and that by closer co-operation between the help some of them could be eliminated. It was not easy, and yet not nearly as hard as was expected. After finally getting started, and the help had accustomed themselves to the new plan of things, the work went on as smoothly as ever, and as just stated, at a large reduction in labor cost.

Condensed, the reduction of cost in the dye house means a closer vigil on all branches of the work, especially materials, equipment and labor.

DISCUSSION

Mr. R. S. Wheeler: Did your mill use the so-called outside experts or men in your mill?

Mr. Field: The operating personnel in the dye house and finishing departments looked after this.

Mr. Wheeler: Mill officials should leave the operation and reduction of costs to their own trained personnel and not bring in outside efficiency experts if they want to secure the best results and keep their workers satisfied.

ANNUAL MEETING WILL BE HELD
in Boston, Mass.
December 4th and 5th

Proceedings of the American Association of Textile Chemists and Colorists

Bleaching and Finishing of Cotton Piece Goods

By **R. S. WHEELER**

Supt. of Crystal Springs Bleachery, Chickamauga, Ga.

WHEN requested to present this paper, I was admonished by your secretary to make it short. I shall be governed accordingly and, therefore, must necessarily omit many details.

At the outset, it is assumed that you have an adequate supply of pure fresh water. This is absolutely essential in the finishing of cotton piece goods.

The process of finishing naturally begins in the grey room where the goods are received from the mill. Here the goods can be only casually inspected as they are laid out for sewing, but if any imperfections are found, the goods should be held out and report made to the proper authorities. Closer co-operation between the grey mill and finishing plants would work to their mutual advantage. In our plant we were dyeing some goods from the bale and at about the center of a cut a slug some three inches long by two inches wide suddenly showed up and before the machine could be stopped the slug had entered the nips and damaged the roll some $35.00 to $50.00. In opening up some goods the other day it was found that the quality was about the same as from any other mill, but some one had marked the yardage with indelible pencil in large figures two to three yards from the end of each piece, resulting in a loss of some two per cent to the mill, as of course the marks must be cut off.

As the goods are laid out they are sewed end to end in a continuous length, the length depending on the weight of goods and size of kier. The writer does not feel that this is quite the proper place to advertise any particular line, but for "the good of the order" he feels constrained to state that in his opinion the Merrow Machine Company has gone a long way toward overcoming some of the trouble experienced in the grey room. The sewing machines which they are now offering the trade, giving a butted seam, reduce the seconds and the seam stays with you to the end.

After the ends are sewed, the goods are then ready for processing. If to be singed, they are taken to the singer, either a flame or rotary plate singer. They are run from the singer through a quench box, containing either hot water or some desizing agent, and dropped into the bins where they are left over night. Goods not to be singed are pulled directly into the bleach house through a washer, preferably containing hot water, where they are left to lie over night. From the wetout or steep bins, the goods are thoroughly washed and given a grey sour consisting of sulphuric acid two to three degrees twaddle, squeezed, run directly over reels through a washer, and fed into kier through kier pilers. The kier charge is made up of caustic and soda ash, two to three percent caustic, one to one and one-half percent soda ash, figured on the weight of the goods, and any other assistant the bleacher may care to use. It is a universally recognized fact that the kier boil is the very foundation of a good bleach. Unless you get a good bottom you cannot hope to have a good white. Manufacturers catering to the bleaching trade have long since recognized this fact. There is hardly a salesman calling on the trade that does not have some remedy for kier trouble.

The grey sour plays a most important part in the preparation of the cloth for the kier. In many instances it is possible to get satisfactory results with one boil, whereas otherwise two boils would be necessary. While getting up pressure, the vent on the kier should be left open so as to expel any air in the kier. The length of boil and pressure vary in many bleach houses, but we should say an eight hour boil at fifteen to eighteen pounds pressure is sufficient in most cases where the goods have been properly prepared before entering the kier. Assuming it takes one-half to one hour to bring the pressure to fifteen or eighteen pounds and it is held constant for eight hours, it should cost in an up-to-date plant $2.00 to $2.50 in steam consumption for a three ton kier. It is generally conceded that the most efficient kiers are the pump and heater type. After the kiers are boiled a sufficient length of time, the steam is cut off, the blow off valve is opened, and cold water run into the kier, in the meantime keeping the pump in circulation.

From the kier the goods are run through a washer and passed through the bleaching liquor, the strength of the liquor depending on the weight of goods and condition of boil.

From the bleaching liquor the goods are dropped into bins and left for some little time, after which they are washed, squeezed, and given an antichlor. If sulphuric acid is used, great care must be taken to see that all trace of acid is removed, else you will have tender goods.

The final, or white, wash should be given through a washer with an abundance of fresh water flowing in and with as many strands of cloth as the washer will contain. The goods are then squeezed and dropped into the white bins where they are ready for the water mangle. The goods for dyeing are dried and sent direct to the dye house.

We now find we are ready for finishing the goods that have been bleached. (Time does not permit considering dyeing and mercerizing.) In the finishing of cotton piece goods no one plays a more important part than the man in charge of the starching. He should certainly know what results he would obtain from the various starches and combinations of starches. If he has a certain finish to match he has to know just what starch or starches should be used and what softening ingredients to produce the desired finish. It is almost impossible to give any satisfactory rule for the finishing of certain goods, as local conditions play a large part in the results. Personally, the writer feels that various corn dextrines and potato starches, with the proper softening ingredients, constitute the main dependence of the starcher, though in some instances tapioca and wheat may be used to advantage. The proper cooking of the mix is as important as the right ingredients.

The Backfiller or Tommy Dodd possibly presents the hardest jobs for the starcher, for verily at this point of the game "there is more in the man than there is in the land." The set of the doctors and the weights play no small part in obtaining the desired finish. Care should be taken to see that the roll is in good condition, free from ridges, and absolutely true.

The man in charge of the calender room shares an equal responsibility in the proper finishing of cotton goods. In order to obtain the best finish, he must know how to operate the various calenders under his control, such as Schreiner, Chasing, Friction, and Rolling Calender, to say nothing of the lowly Sprinkler.

When the goods leave the calender room they go to the cloth room. There great care should be taken to see that the goods are thoroughly inspected and put up in a neat and attractive manner. A good finish can be made of no effect by poor put up. The minute a customer receives a shipment of goods in poor cases or carelessly packed, he immediately begins to look for trouble, and he can usually find it.

Certainly no up-to-date plant would attempt to operate without an adequate cost system so as to determine whether or not they are finishing goods below cost. But in this day of close competition and price cutting one cannot help but wonder if much attention is paid to the cost of finishing.

Discussion

Mr. Jackson: What is the best combination of starches to secure a "stiff hand" on light cotton duck like eight ounce material?

Mr. Wheeler: A combination of potato dextrine and potato starch worked out to fit local conditions usually gives the results desired.

Mr. George K. Hanna, Jr.: What combination will give a "soft hand" or "feel" for coat lining material?

Mr. Wheeler: Corn starch with soluble oils combined will give a soft finish that is satisfactory.

Mr. H. L. Wheeler: What are the fundamentals in securing a "crunch" on cotton flannels?

Mr. Robert Cowan: Taking a cue from the hosiery industry of a few years back, I would suggest trying a small amount of lactic acid as it has the property of giving a "crunch" feel and is still not injurious to cotton materials.

Mr. R. S. Wheeler: To secure the "crunchy" feel on cotton flannels, the kier boiling and bleach gives this property, and the addition of other agents is more or less temporary.

Mr. C. B. Ordway, Secretary, stated that the Council of the A.A.T.C.C. will act on the final application of this section and we need twenty-five members and should have at least fifty to start off a satisfactory section.

Mr. R. S. Wheeler extended greetings to the new section from the South-Central, the group of which he is chairman.

A vote of thanks was given Messrs. Wheeler and Field for their excellent papers.

The executive committee and officials will decide on programs and all suggestions for talks by mill men will be appreciated.

The meeting adjourned.

Respectfully submitted,

Charles B. Ordway,
Secretary.

A COMMUNICATION FROM THE CHAIRMAN OF THE RESEARCH COMMITTEE

In a recent issue of the AMERICAN DYESTUFF REPORTER (October 12, 1931), Proceedings Section, a tentative report of the Sub-committee on Rayon was published. There appears in this issue a tentative report of the Sub-committee on Standard Methods of Determining Sizing and Finishing Materials in Textile Fabrics. It is a report of a provisional method for the identification of the ingredients present in a sized fabric. It is hoped that interested members of the Association as well as non-members will submit at once such criticisms or suggestions as they believe will improve this method, so that the committee may give them full consideration before the method is submitted to the Association for final adoption.

L. A. OLNEY, *Chairman.*

RESEARCH COMMITTEE.

NOMINATIONS FOR OFFICERS FOR AMERICAN ASS'N OF TEXTILE CHEMISTS AND COLORISTS FOR 1932

President:

*P. J. Wood, Vice-President and General Manager, Oriental Silk Printing Co., Paterson, N. J.

Vice-Presidents (two to be elected):

Carl E. Bick, Supt. of Dyeing, Real Silk Hosiery Co., Indianapolis, Ind.

*William H. Cady, Chief Chemist, The U. S. Finishing Co., Providence, R. I.

Alex. Morrison, Asst. Chemist, American Woolen Company, Andover, Mass.

Arthur R. Thompson, Jr., Superintendent, North Carolina Finishing Co., Salisbury, N. C.

Treasurer:

*H. R. Davies, President, Dyestuff Corp. of America, Boston, Mass.

Secretary:

A. Newton Graves, Chemist and Purchasing Agent, Franklin Process Co., Providence, R. I.

Councillors for Three Years (two to be elected):

Dr. Carl Z. Draves, Chief Chemist, Ludlow Mfg. Assoc., Ludlow, Mass.

*Wm. R. Moorhouse, Resident Manager, National Aniline & Chemical Co., Boston, Mass.

*Walter M. Scott, Consulting Chemist, Gustavus J. Esselin, Boston, Mass.

R. S. Wheeler, Supt. Bleaching and Finishing, Crystal Springs Bleachery, Chickamauga, Ga.

Excerpt from Article VIII of Constitution:

"Counter nominations for any office, signed by at least ten members, may be filed with the Secretary not later than November 1."

For the Nominating Committee,

ALEX. MORRISON,

Secretary.

*For re-election.

APPLICANTS FOR MEMBERSHIP

Junior

Thorwald Larson, Research Chemist, U. S. Finishing Co., Providence, R. I. *Sponsors*: W. H. Cady and Alex. Morrison.

Jack H. Collingbourne, Apprentice, Collingbourne Mills, Inc., Elgin, Ill. *Sponsors*: E. W. Robinson and Alex. Morrison.

Active

W. J. Holden, Supt., Meritos Mills, Columbus, Ga. *Sponsors*: W. F. Crayton and Chas. B. Ordway.

Harold L. Wheeler, Supt. Bleaching and Finishing, Oconee Mfg. Co., Whitehall, Ga. *Sponsors*: George K. Hannah, Jr., and Chas. B. Ordway.

Fred. G. Dushame, Supt. of Dyeing, Wood Worsted Mills, Lawrence, Mass. *Sponsors*: Henry D. Grimes and Alex. Morrison.

Clifton S. Pierce, Director of Laboratory, Abraham Straus, Inc., Brooklyn, N. Y. *Sponsors*: Fred. Schlayer and David Aibel.

Henry C. Mullner, Colorist, E. I. duPont de Nemours & Co., Inc., Passaic, N. J. *Sponsors*: J. W. Killheffer and P. H. Stott.

Asociate

Ralph B. Smith, Director Dept. of Engineering, New Jersey Laundryowners Assoc., Newark, N. J. *Sponsors*: Benj. Knapp and S. I. Escoett.

AMERICAN DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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Professor of Chemistry and Dyeing, Lowell Textile Institute
Directing Editor

NORMAN ALBIN JOHNSON
Managing Editor

MYRON DREW REESER
Advertising Manager

Published biweekly by
HOWES PUBLISHING CO., INC.
440 Fourth Avenue, New York City

A. P. HOWES, President — M. D. REESER, Secretary — H. F. CRAWFORD, Treasurer

Subscription price $5.00 per year; Canadian $5.50; foreign $6.00

Vol. XX October 26, 1931 No. 21

LIGHTNING INVESTIGATION

DURING the past summer the General Electric Company has put in a vast amount of engineering effort in a study of the effects of lightning on electric distribution lines. As a result of the summer's investigation what happens when lightning strikes low-voltage electric lines outside industrial plants is now better understood.

Lightning surges or strokes affecting high-voltage, long-distance transmission lines in the past few years have seldom meant more than a momentary interruption of electric service; but a similar stroke or surge affecting a low-voltage line has meant a service interruption of possibly an hour or more. Losses due to such interruptions have cost millions of dollars, burdening both the operating company and the consumer.

Studying means of protection by examination of equipment after lightning has struck is a slow, expensive and uncertain procedure. Electrical engineers, however, have simulated lightning—they have built a portable device capable of injecting bolts of artificial lightning of one and a half million volts, if, when and where desired. And these bolts can be of just the right wave-shape required. Such an artificial lightning generator has decidedly quickened the pace of lightning investigators, and has hastened the arrival of that day when lightning will be reduced to the status of a "has-been" as an electric-service interrupter.

The summer's experiments and tests, conducted with a new 10-mile distribution line, are part of a comprehensive plan of study to find better ways to protect future distribution lines, particularly those of rural districts. The problem of protecting similar circuits in cities is also being given careful study.

Large sums of money have been spent in research and equipment to protect long-distance transmission lines from the ravages of natural lightning; and every possible safeguard is thrown around transmission lines, substations and other links in these systems. In comparison, very little attention has been paid to the immense systems for distributing electricity to the ultimate consumer, even though more capital is tied up in such systems than in transmission lines. Methods of protection for the low-voltage lines are virtually the same as they were 20 years ago.

The lightning generator, located four miles from the oscillograph, hurls bolts of artificial lightning of varying voltages into the line according to a prearranged schedule. The oscillograph at the other end receives these impulses and records them on photographic film.

Exact synchronization of the equipment is essential since a lightning stroke occurs within a matter of a few millionths of a second (microseconds). The oscillograph is not kept in continuous operation, but it must be started just before the effect of the lightning bolt or surge is to be recorded, hence a starting current of a few thousand volts is sent ahead of the actual bolt of high voltage by a matter of microseconds. The oscillograph, thus started in operation, then receives the high-voltage bolt from the lightning generator and records it according to plan. From these records, or oscillograms, calculations are made and conclusions drawn by the engineers.

Among the problems which have been studied are combinations of transformers with lightning arresters, protection of transformer banks, the behavior of fuses under lightning voltages, and other effects of lightning on different equipment used in distribution systems. It is expected that answers to many baffling problems will be forthcoming as the investigations progress.

The importance of these tests to industrial plants cannot be overestimated. More and more of the new textile mills are turning to electricity as a source of power. This is especially true among the smaller concerns who find it more economical to drive their machinery with electrical motors.

DR. SAMUEL W. STRATTON

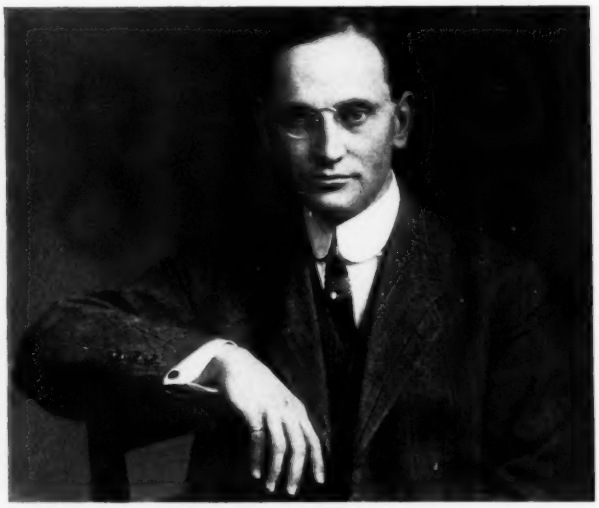
Dr. Samuel W. Stratton, chairman of the corporation of the Massachusetts Institute of Technology, died of heart attack at his home in Boston on Sunday, October 18th. He was the founder and first director of the United States Bureau of Standards, as well as an associate of Thomas A. Edison on the Edison Scholarship at the M. I. T. He had just returned from the Faraday celebration in England and in spite of his age was apparently in excellent health.

He resigned as director of the Bureauu in 1923 to become president of the M. I. T. In 1930 he became chairman and was succeeded by Dr. Karl T. Compton as president.

He was also a member of International Committee on Weights and Measures, American Institute of Electrical Engineers, American Society of Mechanical Engineers, American Physical Society, American Philosophical Socity, National Academy of Sciences, and American Association for the Advancement of Science.

JOSEPH M. MATTHEWS

Dr. Joseph M. Matthews died on Oct. 11th in San Diego, California. He was well known in the textile and dyestuffs business and was recognized as an authority on dyes and textile chemistry. During and after the World War, he defended the American color manufacturers, who were at that time just starting production on a large scale. He was graduated from the University of Pennsylvania with a Ph.D. degree in 1898. From 1898 to 1907 he was at the head of the Department of Chemistry and Dyeing of the Philadelphia Textile School.



He was a member of the American Chemical Society, the Society of Dyers and Colorists (England), the National Research Council, and was a fellow of the American Association for the Advancement of Science. He was also a charter member of the American Association of Textile Chemists and Colorists.

He was the author of "Textile Fibres," "Laboratory Manual of Dyeing and Textile Chemistry," "Application of Dyestuffs," and "Bleaching Technology." He also translated Alexieff's "General Principles of Organic Syntheses."

RED CROSS SERVICE

A glance over the records of the American Red Cross, which this year is observing its fiftieth anniversary, reveals the far-reaching effect of the society's peace-time program. Throughout the year the Red Cross is crusading in home and community health; reducing the hazards of water sports with its life saving program; assisting disaster sufferers both at home and abroad; helping service men and war veterans and their families in every possible way; carrying the message of goodwill and holiday cheer around the globe through the Junior Red Cross, and serving humanity from any other angles.

The society, founded May 21, 1881, by Miss Clara Barton, sprang from an impulse or idea into an organization with millions of members. Last year more than 4,000,000 senior memberships and 7,000,000 junior memberships were on the rolls.

Throughout 1930 and in the early part of this year Red Cross requirements reached new heights. The prolonged drought, which spread its destruction over 22 states, alone resulted in dependence among more individuals and affected a greater area than all the domestic disasters of the previous year combined. That emergency, described as the most serious in the history of this country, was an acid test of Red Cross performance. Now, the drought relief program is history. The Red Cross met the needs of the sufferers adequately. It has not yet undertaken a task which it failed to carry through to a successful completion.

This year the Red Cross Fiftieth Anniversary Roll Call will be conducted between November 11 and 26, Armistice Day to Thanksgiving. The public is invited to join between those dates.

Acquires American Zeolite Corporation

The business of the American Zeolite Corporation, manufacturers of Decalso, a synthetic base exchange material used in the softening of water, was acquired October 1, 1931, through stock ownership by the General Water Treatment Corporation. The business will be operated by the American Zeolite Corporation as a unit of the General Water Treatment Corporation with offices at 440 Fourth Avenue, New York.

The General Water Treatment Corporation was organized in 1930 and at that time acquired the Permutit Company and the Ward-Love Pump Corporation. Through purchase by the Permutit Company, it took over the zeolite and lime soda water softening and filter business of the Paige & Jones Chemical Company.

Yeast Research at Mellon Institute

Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research, Pittsburgh, Pa., has announced that the institution has accepted from the National Grain Yeast Corporation, Belleville, N. J., a grant for a comprehensive investigation of the chemistry and technology of yeast. This research, which will be operated as an Industrial Fellowship of the Institute, will be conducted with the close collaboration of specialists in the donor's organization; and the results will be made available as the various stages of the studies are completed.

An Experience in the Production of Process Water For Use in a Textile Plant

(Continued from page 682)

Obviously, there could be only one eventual result of such treatments, and the time soon arrived when the addition of these chemicals became absolutely unbalanced, so that the man in charge, nor anyone else, had not the least idea of the pre-treatment which the raw water was receiving.

It takes no great amount of imagination to arrive at a decision as to how the filter beds became so "foul" that they no longer could give anywhere near the rated capacity, and it occasions no wonderment that the quality, of the filtered water, suffered severely.

Theory of Water Filtration

One theory of water filtration is based upon the following premise: The function of the alum or aluminum sulphate is to produce a light flock of aluminum hydroxide within the water which is to be filtered. Oftentimes sufficient alkali exists in the raw water to bring about the formation of the flock, but, in any event, the addition of relatively small quantities of alkali suffices under ordinary conditions. The flock, thus produced, serves not only to entangle foreign substances, and at the same time separate out a large portion of the organic matter but accomplishes, what is of far greater importance, i.e., the formation of a "Magma" upon and just below the surface of the upper layer of sand comprising the filter bed. With such a "Magna," properly laid down, the dirt removed from the water does not penetrate below the surface of the sand but builds out and away from the sand. Thus, when the sand bed requires washing, it is not contaminated to an appreciable depth below the surface and consequently is readily washed clean with the minimum amount of water and within the shortest possible time.

A brief consideration of the treatment which the filter beds were subjected to, in the case under review, will serve to shed some light on the "Vile" condition which they eventually assumed.

The "hit or miss" method of adding the caustic soda and the aluminum sulphate to the water undoubtedly allowed, at times, of the saturation of the sand with aluminum sulphate, and when the water was found to be giving an acid reaction was followed immediately with a dosage of caustic soda which produced aluminum hydroxide formation far below the surface of the sand filter. Or again, the beds saturated with soluble sodium aluminate were immediately charged with a solution of aluminum sulphate. Indeed, so many possible combinations exist that it is unnecessary to name more. It suffices, that heavily clotted "Mud Balls" were so prevalent in the sand that the contents of the filter bed had to be completely overhauled and remade by a thorough raking and washing. The foregoing condition produced a direct aftermath in the softening beds.

The rehabilitation of the sand beds was accomplished at a not excessive cost but the expense attendant upon replacing the zeolite beds was an entirely different problem. The cost of zeolite material, as anyone at all familiar with this product knows, runs into very real money, and it is indeed a serious matter when one contemplates the necessity for the removal of several thousand pounds of such material, with the tacit admission that "it is henceforth good for nothing."

What Could Have Caused the Trouble?

What really caused the most concern to the chemist, but did not seem to particularly disturb the "peace of mind" of the others, to whom the matter should have been of vital interest, was the fact that it was not known what had caused the zeolite beds to cease functioning, and consequently the same damage might be expected to occur to the new beds as well, possibly as soon as they were substituted for the damaged zeolite.

What had happened to the zeolite beds, and how could the condition be corrected, was the chief problem which, if possible, must be solved; but what was of far greater importance was to be absolutely certain that if the beds were replaced with new zeolite they should not be allowed to become ruined, by the same treatments which had already caused such havoc.

It did not necessarily follow, even though the cause of the damage could be ascertained, that it would be possible to restore the beds to their original efficiency but it seemed logical that a knowledge of the conditions which had produced the trouble would admit of corrective measures being taken which would prevent subsequent damage to a replacing zeolite. It was, therefore, with a very definite idea of finding out just what condition the beds were in, and if possible, devising a theory which would aid in suggesting a method of reclaiming the material, that the investigation of the damaged zeolite was continued.

Physical and Chemical Examination of Damaged Zeolite

A physical examination of the damaged zeolite, after drying, showed a distinct white deposit, while the original product was of a clear light yellow color. Isolation and examination of this white deposit clearly showed that it consisted of aluminium hydroxide. The first question which had to be answered was: "could this aluminium hydroxide be removed without ruining the zeolite; and would its removal restore the beds to proper working condition?" A practical trial alone would answer this. The second

question which required answer was, "how had the aluminium hydroxide, an insoluble compound, gotten beyond the sand filters and become impregnated with the material comprising the softening beds?" Theory, alone, could answer this.

Bearing in mind that the alum and caustic had been fed to the raw water in such an erratic manner, and in such excessive amounts, it seemed not to transgress the "bounds of reason" to assume that on several different occasions strong treatments with caustic soda, unbalanced through lack of aluminium sulphate, leaving the filtered water alkaline would introduce free caustic soda into the zeolite bed where chemical combination, with later addition of aluminium sulphate, would produce insoluble aluminium hydroxide. The probability seemed likely that this had occurred, not once, but many times until the beds of porous zeolite were so saturated, and coated, with aluminium hydroxide that they absolutely refused to function.

It ceases to be a wonder, that in the meantime, anything but ideal water was finding its way into the plant.

The theory was borne out by the fact that the beds which had a rated capacity of 120,000 gallons each between regenerations now gave no production whatever. The ordinary regenerating treatment, given with the regulation amount of brine, had no effect on the beds, and, therefore, again following the "rule of thumb" the beds must be thrown away.

Chemical Treatment Prescribed

A portion of the lot of zeolite which was tested in the laboratory and found to be impregnated with aluminium hydroxide was subjected to a treatment with strong caustic soda in an effort to convert the aluminium hydroxide into soluble sodium aluminate. It was quickly observed that this treatment gave a zeolite which could readily soften hard water, apparently as well as ever. The question naturally arose, "Can the entire content of the beds, comprising some four thousand pounds of zeolite be commercially treated in such a way that the beds will be reclaimed for further use?" The matter was taken up with the chief chemist and the technical expert of the company who originally supplied the zeolitic material, and while they were frankly sceptical of the outcome, and would take no responsibility in regard to recommending any such "heroic treatment," they were nevertheless, perfectly willing, as long as they had nothing at stake, to observe the action of the strong caustic soda in a commercial application. The fear expressed by them, was that the zeolite would be softened, and so disintegrated, that it would be ruined.

I felt, in this instance that the beds had in reality already been thrown away: that we had everything to gain and "nothing more" to lose, and consequently on a certain Friday afternoon, we proceeded with the treatment, the use of which by Monday morning saw the softening beds restored to their full efficiency. The customary treatment for regeneration called for one hour's submersion of the bed in a strong solution of common salt, this to be followed by a thorough wash. In this case, however, the beds were given two successive treatments of one hour each, in strong brine solution, a thorough wash with filtered water following the second treatment.

This procedure had a three-fold objective: (1), to assure the removal of as much Calcium and Magnesium as possible from the zeolite and their transposition with the Sodium radical. (2), the removal of any Aluminium sulphate which might have been present, and (3), to remove any other water soluble impurities.

The beds were next filled with strong caustic soda solutions, and the zeolite, entirely submerged, was allowed to remain in this condition for a period of twelve hours. At the end of that time, the caustic soda was drained off, and the beds thoroughly washed with filtered water, in order to remove all traces of sodium aluminate, as well as excess caustic soda. When the washing was completed, the water was tested and the quality was found to be fully up to standard, being as soft as any we had ever processed. Constant tests of the water passing through the beds showed no necessity for a further regeneration with salt brine until the full yield of 120,000 gallons of treated water had been obtained from each bed, this yield being fully up to the standard requirements of the system.

The question arose as to how long the beds would continue to function, fear being expressed that the "Drastic Treatment" might have been more destructive than immediate indications showed. As to whether or not the "Drastic Treatment" alluded to, referred to the inane treatments which put the beds out of commission, or to the "heroic treatment" which restored them to full working capacity, I was unable to learn.

Of course, no one could say that the beds would not go "stale" again, and, with this fear in mind, a new lot of zeolite was ordered, and held in readiness should the emergency arise.

With the proper treatments now being given the raw water, the remade filter beds gave an excellent filtered water, and the softening beds, day by day, continued to give a volume of soft water equal to the guarantee of the makers of the apparatus.

It is an interesting fact, and one which deserves mention, that none of the new zeolite was ever added to the beds, over a period of five years, and the full volume of high quality softened water was available at all times, which would seem to offer ample proof that the regenerative process, as carried out, had been entirely and unqualifiedly successful.

BUREAU OF CHEMISTRY AND SOILS
DEPT. OF AGRICULTURE
FEB 17 1932
RECEIVED

Technical Sales Department

L. W. Davis, formerly in charge of research for the Nopco Laboratories, has been transferred to the newly formed technical sales department by C. P. Gulick, treasurer of the National Oil Products Co., Harrison, N. J. Mr. Davis will contact manufacturers in the textile industry as a technician to consult with them concerning their manufacturing problems.

U. S. Chemical Divisions—Missionaries of Color

By WALDON FAWCETT

THE dyestuffs industries stand to gain, in ultimate benefits, far more than most of us have suspected, from the educational, promotive efforts of those branches of the Federal Government most intimately identified with color chemistry. Convention does not ascribe propaganda as any part of the duties of the Chemical Divisions at Washington. Other, of course, than such publicity as may be required to translate to technical circles the result of original research in these quarters. Undaunted by tradition, however, the Federal organizations have, lately, gone out of their way to cultivate a popular appreciation of, and public demand for color in all lines of manufactures.

Indicative of a sympathetic and cooperative attitude at Washington is the recent course of the Chemical Division of the U. S. Bureau of Foreign and Domestic Commerce. Many executives in the chemical industries have visualized this section of the Department of Commerce as an "intelligence office" and liaison agency for establishing contacts between American chemical manufacturers and distributors or large consumers, overseas. That was the primary function. Latterly, however, this Division, in common with all other subdivisions of the Bureau, has devoted increasing attention to domestic commerce. One outcome of this realignment is the evangelism for color. Much of the "promotional information" which is cleared by the Chemical Division is, in the words of Acting Chief T. W. Delahanty, "in connection with the problems submitted by industry generally." A noteworthy fraction is aimed at the general public. And commands the acceptance which springs from reliance upon the authoritative and impartial tone of Government pronouncements.

Illustrative of the trade promotional work that has an eye to cultivation of consumer demand was the recent statement from the Bureau that, despite the increasing use of color in heretofore uncolored items of merchandise, the American dye industry is now supplying 95 per cent of domestic color requirements and will keep step with the expansion resulting from the current trend. It is notable that the Chemical Division, in its role of champion of color in industry, does not admit the possibility that the popular enthusiasm for color in the commonplace articles of everyday use is a passing fad or fancy. On the contrary, the position of the Bureau, in its public expressions is that color is destined to occupy an even larger place in the economic life of the nation, gaining not only in its esthetic appeal but in its practical application as a restful influence or a stimulant for the workers in industry. Discussing recently, the color service of the Chemistry, Acting Chief Delahanty said: "It has many ramifications involving not only the color appeal of the product but likewise the features of labels and advertising. It is so extensive that it would require a list of quite some dimensions were I to attempt to epitomize the instances wherein this type of service has been rendered by us in our trade promotional endeavors."

The Bureau of Chemistry and Soils of the U. S. Department of Agriculture is a technical research center, in contrast to the trade promotional agency at the Department of Commerce. Nevertheless, the agricultural annex is quietly contributing a quota of popular missionary work. Particularly is this institution engaged, systematically, in acquainting the public with the fact that vat dyes are responsible in no small degree for the latter-day popularity of cotton goods.

In a recent statement, circulated by the Department in an edition of hundreds of thousands of copies, Mr. P. H. Groggins, Senior Chemist assured the consuming public that vat dyes as a class possess excellent fastness to light and severe washing. He pointed out to the popular audience that these, the fastest and most complex of synthetic colors, are not attacked by weak acids and alkalies, and only faintly by bleach or perspiration.

Paying tribute to the commercial dystuffs industry, incidental to his educational gesture, Chemist Groggins has explained that the dyeing process must be subjected to a very refined control in order that the printed vat colors may be developed to their maximum fastness and brightness. To bring his text within the comprehension of the popular audience, the specialist at the Chemistry Bureau has compared the printing with vat colors to the procedure in printing the colored supplements of Sunday papers. He has further pointed out that it is the utilization of printing methods for applying vat colors on lustrous cotton goods that has made possible the manufacture of a class of fabrics at once serviceable and attractive.

Of interest, possibly, within the trade circle, is the confidence which the spokesman of the Chemistry Bureau is displaying before the public in respect to the permanency of the present favor for colorful cottons. Mr. Groggins interprets the vogue for fast-colored cotton goods as not only reflecting a public appreciation of color

but as revealing an innate desire to combine the esthetic with the practical. His conclusion is: "The combination of permanent colors of many hues on a lustrous cotton will always be in demand. The printing of artistic and novel designs makes possible dyed creations which are destined to remain popular and continue in fashion."

A significant offshoot of the general promotive campaign at the Department is an educational thrust, directed at the cotton growers of the country in an effort to arouse them to production of higher grades of cotton in order that the full possibilities of vat dyes may be realized. Listeners-in throughout the Cotton Belt are being told that cotton must be uniformly bright and lustrous if the best results are to be obtained in printing cotton fabrics. Given the best possible raw material, the Department assures the growers that mechanical and chemical processes will provide the dyer with means to apply his vat colors to best advantage. In this connection the Department plays up its new series of vat-dye intermediates and predicts that the new acquisitions will lead to the production of fast dyes that should materially widen the market for cotton goods.

The New—Uses—For—Cotton Section of the Department of Agriculture is securing considerable eulogistic publicity for American dyes in connection with the promotion of certain of its discoveries. Cotton research at the National Bureau of Standards, directed toward new or improved cotton textiles has, also, a sequel of benevolent propaganda for the dye industry. Having devoted some years to the provision of a background of research covering wrinkleability, permeability to air and moisture, fastness to light, washing, mill processing, cleaning, etc., the Bureau has lately entered upon an intensive study of finishing processes including dyeing, as well as bleaching, mercerizing, etc. It is expected that if it can be shown that cotton may be invested with undreamed of properties through the development of finishing processes, it will be possible to catch the popular imagination with the news in a degree that was never attainable when the progress reports from the laboratory dealt with different sizes of yarn and variations of twist. All the research work in this line at the Bureau of Standards has approached the subject of textile improvement and diversification from the angle of public needs and wants. Therefore it is argued that it will be the easier to interest the public in the results when these may be expressed in terms comprehensible to the everyday consumer.

Eastern Representative

Mr. C. W. Sampson, formerly with the sales service division of the Tubize Chatillon Corporation, New York City, has resigned his position to be the Eastern representative of the Twitchell Process Company, with headquarters at Providence, R. I.

The Effect of Tension on the Dye Absorptive Properties of Regenerated Cellulose Rayon

(Continued from page 680)

Conclusion

The experiments described above clearly indicate that tension applied to regenerated cellulose rayons during the dyeing operation retards dyestuff penetration of the great bulk of all substantive dyestuffs although this retarding effect is not uniformly pronounced for all dyestuffs.

Whether or not there may be some dyestuffs that do not react as the above experiments would indicate, we cannot state, as we have not gone to the extent of testing all known substantive dyestuffs in the above described manner.

Our work clearly indicates that uneven tensions applied to rayon yarns during fabric manufacturing processes (spooling, beaming, warping, weaving, etc.), can seriously affect the level dyeing properties of the rayon treated, particularly when the treated fabrics are dyed in such a manner that uneven tensions existing in the fabric must be maintained throughout the dyeing operation.

Arc Welders Analyzed

"Arc Welders," published by the General Electric Co., deals with the development and perfecting of welding, as applied in the production of silk and rayon machinery and the equipment for silk and rayon mills. Both stationary and portable outfits are dealt with. Improvements noted in this booklet include:

A highly responsive arc, caused by the heightened recovery of voltage from a short circuit to a practically open circuit voltage.

A duplex voltage control covering a spread, which makes special provision for a surplus voltage. This is valuable when long welding leads are required. The control, of course, is by the operator.

A simplified method of operation by which the operator is said to benefit considerably.

Although frames and other parts, in the past, have been bolted together, the booklet explains the manner in which there has been an increase in the number of silk machines in which these parts are welded when received from the manufacturers. This is due, it is believed, to the fact that the cost is smaller, the operation simpler and the strength of the product greater.

DON'T FORGET!

ANNUAL MEETING A A T C & C

Boston, Mass., Dec. 4th and 5th

British Dyers Employ New Method of Heating Dyebaths

Good Results Obtained with Submerged Combustion

By C. H. TUPHOLME

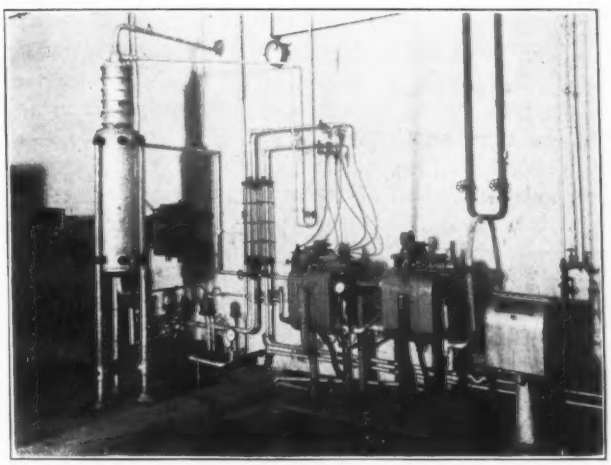
ONE of the most interesting applications of the Hammond submerged combustion system has been in the dyeing plant of a works near London, where very good results are reported, the fuel used being city gas. In this system the liquor is heated by a flame burning actually under the surface of the liquid.

In order to burn a flame continuously under the surface of the dye liquor an enormous rate of heat emission is necessary to prevent cooling or extinction, while almost as essential is the proper mixing of the gas and air and the elimination of the danger of the flame striking back. The exact theoretical amounts of gas and air for complete combustion are supplied under pressure, a city gas of 500 B.t.u. cu. ft. requiring a mixture of 4.7 volumes of air to 1 volume of gas, each at 5 lbs. pressure, which is obtained by means of a small electrically driven duplex booster in the circuit. This delivers the gas and air separately to a proportion valve capable of very accurate adjustment by means of which the correct volume of each is supplied to the burner.

In the head of this burner is a mixing device consisting of four vertical tubes with axial slits for the gas, and twelve much smaller tubes with similar slits for the air. Both sets of slits discharge at different angles to a central large diameter tube or chamber, and the result is a violent turbulent mixing action of such an effective character that combustion is complete, lower down in the burner, with the theoretical amount of air as indicated, giving a temperature at the center of the flame of 5400 deg. F.

The burner is constructed of steel and lined with a refractory material known as Alundel. The rate of combustion is very rapid, 20 million B. t. u. being given out per hour for every cu. ft. of combustion space.

The machine illustrated is of 14 gallons capacity and has been designed primarily for the dyer and cleaner who has to deal with made-up garments such as dresses, lingerie, felt hats, hosiery and other small articles in small batches or single pieces. The combustion unit is mounted in a circulator chamber connected to the rear of the vat. The rising main from this circulator delivers aerated liquor through a slotted opening across the whole width of the vat at the back. This aerated column of liquor creates an unbalanced effect in the main body of the liquid in the vat, so that the heavy side represented by the unaerated liquor in the front portion of the vat tends to sink by its superior weight, displacing the aerated side upward. The combustion gases come away continuously at the surface, and the result is that a continuous rotary motion is given to the whole content of the vat.

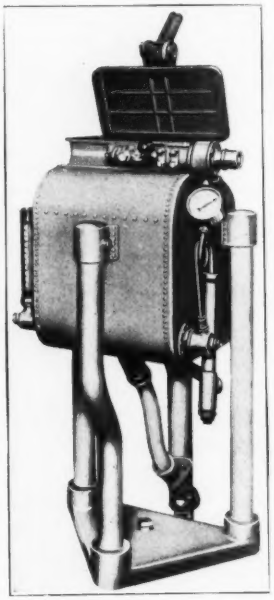


Fourteen gallon dye vats in operation in a London dyeworks, operated by submerged combustion.

Liquor replacing that lifted by the combustion spaces returns through a perforated inner wall at the front of the machine by way of the return pipe, which is visible in the photograph. The machine is fitted with a vapor-tight lid and a spring-loaded outlet valve for the exhaust gases, the tension on which can be adjusted to maintain an internal pressure on the system. This is provided for the purpose of increasing the working temperature above the normal for the system when this is required.

It is, however, being found that the temperature normal to the system under atmospheric pressure is sufficient to bring about complete discharge of the color from

the bath to the goods. It is found in practice that the complete process is more efficiently carried out at a lower temperature when the submerged flame is used than that required for the same result when the vat is heated by steam.



Hammond-Vortex Dyeing Drum

It is obvious to everyone that the process of dyeing woolen fibers and goods is fraught with the danger of shrinking if the process is carried out at or near 212 deg. F. Better results are obtained with the submerged combustion process, the tinctorial results being as good and penetration better at 180 deg. F. This gives a substantial margin of safety against damage by overheating. That this feature is even more important in the case of certain classes of rayon will be obvious.

Rayon Weighting

Solution of the problem of weighting of rayon knit underwear fabrics is simple, in the opinion of the October issue of the "Textile Organon," published by the Tubize Chatillon Corp.

This solution, it points out, consists of purchasing fabric by specifications of so-many yard per pound with a certain number of stitches and wales per inch.

The company's house organ discusses the weighting of rayon underwear at length. Its comments follow:

What Weighting Is

"What is meant by 'rayon weighting'? By way of background, it should be mentioned first that in the converting and finishing of rayon underwear fabric, it has been customary to add certain finishing materials during, or subsequent to, the dyeing operations in an amount varying from ½ to 3 per cent.

"Rayon weighting today essentially consists of the addition of a finishing agent to the knitted cloth before it is sold to the cutter or the garment manufacturer, in an amount varying from 5 per cent to as high as 16 per cent of the weight of the cloth. Various weighting agents are used, one of the most popular being magnesium sulphate or common epsom salt. Barium salt and ordinary water also have been used to weight the fabric.

"Epsom salt is a deliquescent substance (absorbs water from the air) and is water soluble. When dipped in an epsom salt bath, the rayon fabric will take on a certain amount of the epsom salt. When dried, the fine powder of the epsom salt will cling to the fabric and diffuse the light striking the fabric. The result is a de-lustered effect and not an inherent low-luster effect, of course. In addition, the salts give the fabric a full, heavy hand.

Object of Weighting

"What is the object of this weighting and some of its contingent results? Of course, the weighting increases the weight of the cloth, by definition. Further it gives an ordinary cloth a fine, finished appearance and hand, making it attractive for the retailer. In addition, it allows a sleazy, stretched fabric, such as 36 stitches per inch, to be weighted so that the final product will appear to the consumer as heavy and as fine as a 42 stitch fabric. It is not meant to imply here that a 42 stitch fabric is the most desirable one; the figures are used only to give an idea of the ratio.

"So far it would seem that a weighted fabric is preferable to an unweighted one. A cheap weighting substance has replaced rayon and a beautiful garment has been made. But here the beauty apparently ends, because on the first washing of the garment by the consumer, the soluble weighting agent dissolves and, presto, the garment becomes its old, sleazy self. Gone from the garment is the low luster and the good hand.

Trade Buyer Not Fooled

"This point brings us to the advantages and disadvantages of weighting rayon fabrics by the present methods. First, inasmuch as rayon underwear fabric is sold by the pound, the weighting of the fabric tends to cheat the cutter-up, the garment manufacturer. Not a great deal of sympathy can be evinced here because it is inconceivable that an astute cutter or garment manufacturer should long be tricked by such a simple thing as weighting. It is apparent then that these people are aware of the practice and have either tolerated it or have agreed to it; due allowance is undoubtedly made for the weighting when they pay for the fabric.

"The second advantage of the plan is to add over-the-retail-counter appeal to the garment. It should be apparent that this is the main object of weighting. Consequently not only does the consumer suffer on his purchase, but as this purchase will have a bearing on his reordering of the product, the reputations of the retailer, the garment manufacturer, the cutter, the knitter and the rayon producer are at stake.

"The only real harm that the weighting may do to the garment itself is that some weighted garments may become rancid or tender if left on the retailers' shelves for too long a time.

The Way Out

"The object of weighting then has been to sell an inferior product as a standard product. The blame lies not only with the knitter, but all along the fabricating and distributing line where everyone, except the consumer, knows or should know just what he is buying and selling in his everyday business. . . ."

New Patents

(Abstracted by Synthetic Organic Chemical Mfrs. Assn.)

Anthraquinone Dyestuffs. (Obtainable by boiling a cyanogen compound with a primary aromatic amine, with the addition of an acid binding agent, such as sodium acetate, dyeing wool red to green shades of good evenness and color in artificial light.) Max Kugel, of Leverkusen-on-the-Rhine, Ger., assignor to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,821,019, September 1, 1931.

Vat Dyestuffs of the Benzanthrone Series and a Process of Making Same. (Comprise melting a Bz-1-Bz-1'-zenzanthronylsulfide with an alkali metal hydroxide in the presence of an aliphatic monatomic alcohol, dyeing cotton blue tints.) Paul Nawiasky, of Ludwigshafen-on-the-Rhine, and Eduard Holzapfel and Otto Braunsdorf, of Hochst-on-the-Main, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,821,023, September 1, 1931.

Compounds of the Anthracene Series and Process of Preparing Them. (Intermediates for dyestuffs and pharmaceutical products, obtained by treating a 1.2.3.4-tetrahydroanthraquinone with a nitrating agent, advantageously with nitric acid in the presence of sulfuric acid.) Karl Schirmacher, of Frankfort-on-the-Main-Hochst, and Hans Schlichenmaier, of Bad-Soden-Am-Taunus, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,821,035, September 1, 1931.

Process for Manufacturing 1-Halogen-2-Amino-Naphthalene-Sulphonic Acids. (Dyestuff intermediates, which comprise replacing one hydrogen atom of the NH_2 group of a 2-amino-naphthalene sulphonic acid, treating the 2-acyl-amino-compound thus obtained with a halogenating agent and splitting off the carboxylic acid residue by saponification.) Norbert Steiger, of Frankfort-on-the-Main, Ger., assignor to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,821,038, September 1, 1931.

Hydroaryl Amino Anthraquinone Compounds and Process of Making the Same. (New products, for example, 1-amino-4-hydroaryl amino-2-anthraquinone sulfonic acids, which are water soluble, blue, crystalline substances, dyeing wool clear, blue shades, fast to light.) Klaus Weinand, of Flittard, near Cologne-on-the-Rhine, Ger., assignor to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,821,043, September 1, 1931.

Manufacture of Azo Dyestuffs. (Comprises diazotizing 4-nitro-4'-amino diphenyl sulphide and coupling the diazo compound with a coupling component of the benzene, naphthyl and pyrazolone series, dyeing vegetable or animal fibers, or regenerated cellulose silks, or cellulose esters, orange to red to yellow shades.) Rainald Brightman, of Blackley, Manchester, England, assignor to British Dyestuffs Corp., Ltd., of Manchester, England, No. 1,821,255, September 1, 1931.

New Azo Dyestuffs and Their Application. (Obtained by combining a tetrazotized 4:4'-diamino diphenyl mono- di- or tri-sulphide with two molecules of suitable end components, dyeing animal or vegetable fibers or regenerated cellulose silks; yield on viscose silk shades ranging from scarlet to brown to yellow.) Rainald Brightman and Percy Chlorley, of Blackley, Manchester, England, assignors to British Dyestuffs Corp., Ltd., of Manchester, England, No. 1,821,256, September 1, 1931.

Manufacture of Azo Dyestuffs. (A division of above patent No. 1,821,256.) Rainald Brightman and Percy Chlorley, of Blackley, Manchester, England, assignors to British Dyestuffs Corp., Ltd., of Blackley, Manchester, England, No. 1,821,257, September 1, 1931.

Manufacture of Disazo Dyes. (Obtained, for example, by coupling a diazotized 4:4'-diamino-diphenyl di- or tri-sulphide with two molecules of a sulphonated pyrazolone; dyeing wool yellow shades fast to washing, alkaline milling, stoving and light.) Rainald Brightman, of Blackley, Manchester, England, assignor to Imperial Chemical Industries, Ltd., of London, England, No. 1,821,290, September 1, 1931.

Dyeing Fibrous Materials. (Relates to a composition of matter comprising an aliphatic alcohol and a naphthalene sulfonic acid.) Joseph Nusslein, of Ludwigshafen-on-the-Rhine, Ger., assignor, by mesne assignments, to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,821,476, September 1, 1931.

Bromination Products of 4,4'-Dimethyl-6,6'-Dichloro-Thio-Indigo and Process of Making Same. (Vat dyes possessing excellent fastness to light and washing, varying in shade from a yellowish red to a bluish red.) Ivan Gubelmann, Joseph B. Oesch, of So. Milwaukee, and Emeric Havas, of Milwaukee, Wis., assignors, by mesne assignments, to Newport Chemical Corp., No. 1,821,705, September 1, 1931.

Manufacture of Azo Dyestuffs. (Consists in coupling a diazo-compound with the methyl pyrazolone from 4'-amino-4-hydroxy-diphenylmethane-3-carboxylic acid, dyeing wool, when after-chromated, a yellow to orange tint of remarkable fastness.) Paul Laeuger, of Basel, Switzerland, assignor to the firm J. R. Geigy S. A. of Basel, Switzerland, No. 1,821,759, September 1, 1931.

New Azo Dyestuffs. (Relates to heavy metal compounds of the azo dyestuffs obtainable by combining a

diazo compound of a 2-aminobenzene-1-carboxylic acid sulfonamide with any coupling components. Dyestuffs may be produced in substance or on the fiber, yielding on wool in an acid bath a yellowish-red shade and by after chroming, a Bordeaux red fast to light, fulling and carbonizing.) Winfrid Hentrich, of Wiesdorf-on-the-Rhine, and Eugen Rimele, of Leverkusen-on-the-Rhine, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,821,938, September 8, 1931.

Azo Dyestuffs. (Obtained from diazo compounds of an aminobenzoic acid esterified with alcohols and a coupling component, and to color lakes obtainable therefrom, yielding dyeings on wool of good fastness to light and washing.) Hans Krzikalla, of Mannheim, and Franz Bluemmel, of Seckenheim, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,822,044, September 8, 1931.

Azo Dyestuff Components and Process of Preparing Them. (For example, hydroxynaphthylguanidines, obtained by causing a cyanamide to act upon the hydrochloride of 1.7-amino-naphthol in an alcoholic solution.) Eduard Sprongerts, Maximilian Paul Schmidt, and Robert Franke, of Wiesbaden-Biebrich, Ger., assignors to Kalle & Co., Aktiengesellschaft, of Wiesbaden-Biebrich, Ger., No. 1,822,065, September 8, 1931.

Manufacture of Vat Dyestuffs. (Intermediates and vat dyestuffs containing halogen and dyeing from violet to blue shades obtained by acting on Bz-1.Bz-1'-benzanthronyl sulfids with halogenating agents and treating the intermediary products so obtained containing halogen and sulfur with alkaline condensing agents.) Paul Nawiasky, of Ludwigshafen-on-the-Rhine, and Otto Braunsdorf and Eduard Holzapfel, of Hochst-on-the-Main, Ger., assignors, by mesne assignments, to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,822,367, September 8, 1931.

Acridine Dyes and Process of Making Same. (New basic dyes for printing or dyeing leather and mordanted cotton as well as paper, silk, wool and other fibers, comprises subjecting the products obtainable by the action of acetaldehyde on acridine yellow in the presence of mineral acids to the action of zinc in the presence of sulfuric acid.) Lucas P. Kyrides, of Buffalo, N. Y., assignor to National Aniline & Chemical Co., Inc., of N. Y., N. Y., No. 1,822,490, September 8, 1931.

Manufacture of Mordant Disazo Dyestuffs. (Consists in diazotizing hydroxyl-free amino-sulphonic acids of the naphthalene series, coupling the diazotized body with 1.6-naphthylamine sulphonic acid to form an intermediate product, then further diazotizing the latter and finally coupling same with salicylic acid, yielding brown chromium prints of great fastness to soap, washing and light.) Leopold Oswald, of Basel, Switzerland, assignor to the firm J. R. Geigy S. A. of Basel, Switzerland, No. 1,822,784, September 8, 1931.

1932 Spring Woolen Colors

New renditions of red, including subtle terra cotta and rust shades, as well as vivid scarlet and geranium types, figure prominently in the range of fifty colors which will appear on the Spring 1932 Woolen Card to be issued shortly by the Textile Color Card Association. Advance swatches of the new shades have just been sent out to members in the woolen industry, it was announced recently by Margaret Hayden Rorke, managing director.

Blues likewise occupy an important place, being reflected in clear navy and lighter than navy tones, soft slate versions and vibrant sports blues of slightly purplish cast. The favor accorded sailor and yachting fashions at Biarritz and Juan-les-Pins this past season forecasts the vogue for navy and bright blues for Southern resort wear, especially when allied with white.

A new note is presented in the gamme of Spring browns, which comprise soft chocolate shades, creamy medium browns and light coppery hues.

Beiges, forecast as a high-fashion revival for Spring, are shown in various tonalities, the soft blush and vanilla tints being of major style interest. Champagne and sandy beiges represent the more staple types. A new bleached white is substituted for eggshell as a smart accent note with brown, blue or other basic costume colors.

The green family is expressed in soft olive and slightly yellowish tones, bluish sea greens and virile sports hues.

An important feature of the new card will be the collection of pastel and more animated Spring colors, especially adapted to spectator and active sports costumes, as well as accent notes and Junior and children's wear. This special group highlights yellowish fruit greens, lime-flavored yellows, brilliant orange and poppy hues, as well as softer shades in the range of the new copper rose and peach tones.

Rejoins Permutit Company

After about a year and three-quarters as manager of sales of the Paradon Company, Mr. West has returned to the Permutit Company as district sales manager with headquarters at 712 Brisbane Building, Buffalo, New York. Mr. West was associated with the Permutit Company from 1918 until 1930, and has had very broad experience in the treatment of industrial water supplies. His return to the Permutit Company is effective as of October 1, 1931.

Annual Meeting

The annual meeting of members of the corporation of the U. S. Institute for Textile Research, Inc., is called for 10 A. M. Thursday, November 5th, in Room A of the Chemists Club, 52 East 41st St., New York City, for action upon annual reports of the officers and directors, for the election of directors and action upon other matters.

A meeting of the Board of Directors, that will also be a meeting of members, will be held at the same hour in Room C, and the meeting of members will be adjourned until 12:30 P. M. Members who do not intend to be present are requested to forward a notice of proxy to the secretary.

NEW EQUIPMENT

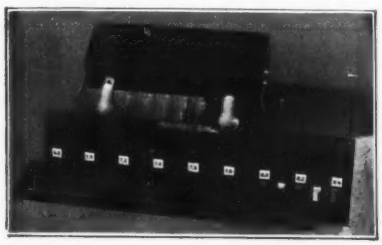
New Bleach and Chlorine Control Equipment

By F. R. McCrumb

Chemical Director, W. A. Taylor & Company, Baltimore, Md.

ALTHOUGH bleaching by means of active chlorine in the form of bleaching powder, hypochlorite, etc., has been carried on in the textile industry for many years, no simple and rapid method of control has ever been developed. Recently, however, there has been devised the chlorine slide colorimeter which is particularly useful for this purpose. The operation of this testing set is so simple that an ordinary workman can determine the available chlorine content of a bleach bath in a very few minutes.

The chlorine slide colorimeter, which is molded entirely from Bakelite, consists of two principal parts, the slide and the base. The slide is a Bakelite case 10 inches long, 2¾ inches high and ⅝ inch thick. It contains 17 vertical holes and 17 horizontal slots which pass through the exact centers of the holes. In these holes are placed the 9 color standards for chlorine concentrations of 5, 15, 25, 50, 75, 100, 150, 200, and 250 parts per million, and 8 ampoules of distilled water. All these ampoules are held in place by a lid which is screwed on the top of the slide.



The base consists of two parts. The lower part contains a slot in which the slide may be moved back and forth, two holes containing vials of reagents, five holes containing test tubes, and a closed compartment for a ground glass plate. Horizontal slots run through the three center holes in the base holding the test tubes, these slots corresponding exactly with any three of the slots in the slide. The ground glass is contained in a closed compartment directly behind the three slots in the base. The upper part of the base serves as a cover for the vials and test tubes when the set is not in use. It is fastened to the lower part by means of spring catches.

To determine the available chlorine content of a bleach solution, a measured sample is diluted so that the chlorine content of the diluted portion will be 250 p.p.m. or less. Three tubes are then filled to the mark (5 cc.) with the diluted sample and placed in the holes back of the slots in the base. To the central tube is added 5 drops of Reagent 1 and the contents well mixed. To this same tube is then added 0.5 cc. of Reagent 2 and the contents again well mixed. The slide containing the standards is placed in position on the base and is moved back and forth in front of the test samples until a color match is obtained. The chlorine content of the diluted sample is then read off directly from the values on the front of the slide. This value multiplied by the number of times the original sample was diluted, and divided by 10,000, will give the concentration of available chlorine in grams per 100 cc.

By expressing the concentration of chlorine as grams per 100 cc., one avoids the use of a chemical balance or hydrometer, either of which are required when the concentration is expressed as per cent by weight. However, except in very concentrated solutions, the difference between grams per 100 cc. and per cent is negligible. For example, a concentration of 2 grams per 100 cc. is for all practical purposes the same as 2 per cent.

To give some idea as to the relative accuracy of the chlorine slide colorimeter when applied to solutions used for bleaching, etc., a series of actual determinations is given in the following table:

Chlorine by Colorimeter

Sample	Dilution	Reading p.p.m.	Grams of Chlorine per 100 cc.	Chlorine by Titration Grams per. 100 cc.
1.	1 in 200	225	4.50	4.25
2.	1 in 100	200	2.00	2.11
3.	1 in 100	175	1.75	1.73
4.	1 in 100	125	1.25	1.18
5.	1 in 100	75	0.75	0.82
6.	1 in 100	37.5	0.38	0.38

In any bleaching operation where the possible variations in available chlorine will be fairly well known, a standard dilution such as 1 in 100 can be adhered to. At this dilution the reading on the diluted portion in parts per million need only be divided by 100 to secure the available chlorine content of the original bleach solution in grams per 100 cc. This so simplifies the procedure that practically any workman can be taught to make the determinations.

In addition to the set just described, a testing outfit has been developed for controlling very low concentrations of chlorine such as are employed in the sterilization of water, sewage, wastes, etc. One application of this outfit that is of interest to many is the control of algae, which cause slime on the surface of condensers and machinery. This set, the Enslow slide chlorimeter, is similar in construction to the chlorine slide colorimeter, except that molded Pyrex glass cells are used instead of test tubes and only one reagent is required. The slide contains standards representing 0.0, 0.1, 0.15, 0.2, 0.3, 0.4, 0.6, 0.8, 1.0 p.p.m. of chlorine.

Each of these sets is supplied in a polished wooden case 11 x 3.75 x 4.75 inches, with a handle for carrying. The case serves not only to keep all the equipment together in portable form but also to protect the sets from dust and dirt when not in use.

Opportunity for Coal-Tar Products

According to Consul Hugh S. Fullerton, Kovno, a Lithuanian manufacturer is interested in the purchase of coal-tar dyes and intermediates and certain other chemicals. Properly accredited American firms may obtain details upon application to the Chemical Division, U. S. Dept. of Comm.

R & H Transfers

The following members of the research staff of The Roessler & Hasslacher Chemical Company, Incorporated, have been transferred from the plant at Perth Amboy, N. J., to the Niagara Falls, N. Y., plant within the past three months: Dr. Sterling Temple, Dr. B. S. Lacy, Dr. A. M. Muckenfuss, Dr. J. F. Reichert, Dr. C. J. Wernlund, Mr. A. T. Hawkinson, Mr. A. W. Rudel, Mr. J. M. Wainscott, Mr. H. A. Bond, Mr. P. M. Paulson, Patent Specialist; Mr. M. Marean, Librarian, and from the New York office, Mr. I. L. Ressler, Entomologist.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF AMERICAN DYESTUFF REPORTER, published bi-monthly at New York, N. Y., for October 1, 1931.

State of New York, County of New York, s.s.:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Alfred P. Howes, who, having been duly sworn according to law, deposes and says that he is the Publisher of the AMERICAN DYESTUFF REPORTER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of—— Post office address——

Publisher—Alfred P. Howes, 440 4th Ave., New York, N. Y.
Editor—Louis A. Olney, 440 Fourth Ave., New York, N. Y.
Managing Editor—Norman A. Johnson, 440 Fourth Ave., New York, N. Y.
Business Manager—William Howes Collins, 440 Fourth Ave., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company,' or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Owner: Howes Publishing Company, Inc., 440 Fourth Ave., New York, N. Y.
Stockholders:

Alfred P. Howes, 440 Fourth Ave., New York, N. Y.
Mary K. Howes, Rutherford, N. J.
Cecile R. Howes, Rutherford, N. J.
James T. Howes, Rutherford, N. J.
Derfla C. Howes, Rutherford, N. J.
N. H. Hiller, Carbondale, Pa.
Louis A. Olney, Lowell, Mass.
Wm. F. Collins, Upper Montclair, N. J.
Derfla H. Collins, Upper Montclair, N. J.
William H. Collins, Upper Montclair, N. J.
Jos. L. Schroeder, Hartsdale, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is.....(This information is required from daily publications only.)

ALFRED P. HOWES, Publisher

Sworn to and subscribed before me this 30th day of September, 1931.

(SEAL) CAROLINE ESSENBREIS

(My commission expires March 30th, 1933.)

Haitian Logwood Exports Decline

According to Consul Donald P. Heath, Port-au-Prince, Haitian exports of logwood during the first nine months of the July, 1930-March, 1931, fiscal year ending June 30, 1931, declined to 18,150,028 kilos, valued at $293,-242, compared with 23,129,560 kilos, worth $436,877, in the July, 1929-March, 1930, period.

Correction

Through an error in the John Campbell advertisement of Oct. 12th one of the properties of Campbell's new Celacyl Brilliant Yellow W was listed as "rapid drying" whereas it should have read "rapid dyeing."

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED

DYER—Six years' experience at bleaching and dyeing wool, cotton, jute and union raw stocks and yarns. Thoroughly experienced in all stages of carpet manufacture. Age, 26; married. Address: Classified Box No. 692, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED

Man fully experienced in color matching, Dyetesting and Standardization by a Dyestuff Manufacturing Co. Should be familiar with the different classes of Dyestuffs and their application to miscellaneous fibres. A day graduate of a recognized textile school is preferred. Give full details as to experience, reference, alary expected, etc. Reply to Box 698, American Dyestuff Reporter, 440 Fourth Avenue, New York, N. Y.

POSITION WANTED

Research and plant chemist, 37 years old, ten years' experience leading silk dyeing and printing organizations. Capable conducting research work for improving quality silk, weighted silk, rayon, Celanese fabrics; or supervising silk or rayon chemical, dyeing operations. Full information upon request. Address Box No. 701, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED

Junior textile chemist, college man, laboratory and mill experience in knit and skein rayon, full fashioned hosiery, and cotton and wool dyeing. Address Box No. 702, American Dyestuff Reporter, 440 Fourth Avenue, New York City.